ARCHITECTURE DEPARTMENT **CHINESE UNIVERSITY OF HONG KONG**

MASTER OF ARCHITECTURE PROGRAMME 2001-2002 DESIGN REPORT

MARITIME SAFETY ACADEMY AND ITS PUBLIC INTERFACE

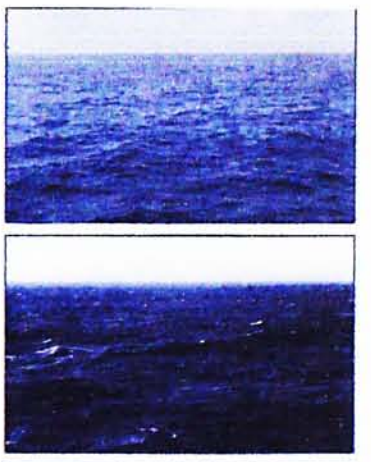
LAM Kam Fai Jeffrey April 2002

Design Report

Maritime Safety Academy and its Public Interface

Master of Architecture,

March 2 Thesis.



Student: Lam Kam Fai, Jeffrey

Student no.: 00201560

Instructor: Adjunct Assistant Professor, Timothy NUTT

Department of Architecture,

The Chinese University of Hong Kong

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1. Introduction

1.1 Scope of interest

The thesis focuses on the establishment of a maritime training academy, which provide training for new generation officers in the field. The academy is supposed to provide training for personnel who can assist to maintain Hong Kong's status as one of the best seaports in the world. The thesis aims at investigating the possibility of a new maritime training academy on one hand, and explores architectural challenge and solution on the other.

The academy is not only an improvement of the current training facilities, but a place to redirect and lead the advancement of the industry. Safety, one of the biggest concerns in maritime activities, should be strong emphasized in the new academy. Not only seafarers can be benefited from the new academy, but all personnel who are responsible for maritime safety. In doing this, the academy promotes participation and co-operation of people from different positions and backgrounds, which strengthens the linkage and provides better quality of work in maritime safety.

In architectural point of view, by considering the ideal setting of the center induces architectural challenge and opportunities. The academy provides training for people to respond in a specific environment in the ocean, as an academy on land, the architectural setting, most preferably, can induce trainees' thinking and imagination towards those situations.

Other than education, the academy also serves as a place to promote maritime or water safety to the public. By doing that the message of maritime or water safety can be deliver not only to the seafarers, but also to the general public.

1.2 What is a Maritime Safety Center

Maritime Safety Center is a center providing comprehensive training for ensuring safety of the maritime activities. Training

covered by the center will be focused on several major areas, which can be safety, seaport control and environmental protection. Other than that, the center can also be an authority of issuing certificate of life-saving devices, researching various topics on maritime safety and a place for spreading maritime safety.

1.3 Users benefited from the center

The target trainee of the center would be officers of various commercial watercrafts, fire fighters and seaport traffic controllers. The center is also a venue for international conference, which aim at higher the safety standard of the maritime activities, promotes international cooperation and applies latest rules and technology on the maritime activities.

2. Port Traffic and Water Transportation in Hong Kong

2.1 Total amount of goods transported through water in the past and future

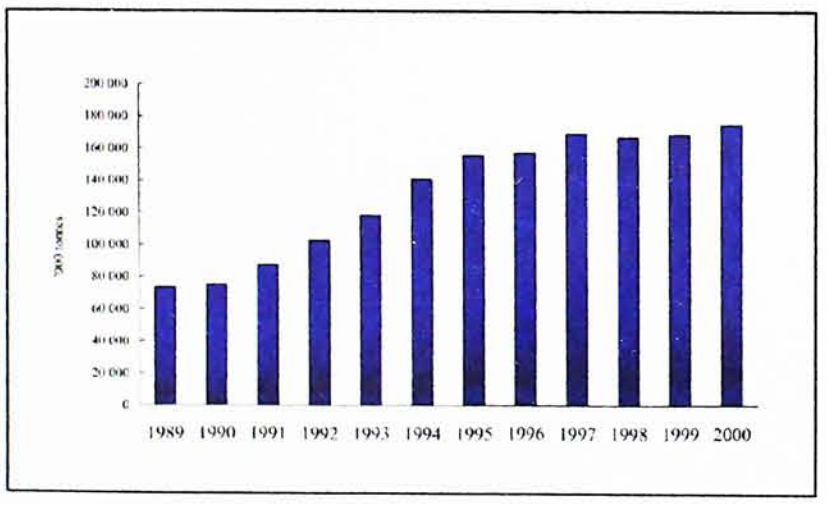

Fig.1 Trend of Port Cargo Throughput

According to the Summary Statistics on Port Traffic in Hong Kong provided by the Hong Kong Port and Maritime Board[1], the Port Cargo Throughput, that is the amount of cargo transported through sea or river, increases steadily during the past 10 years (Fig.1). The amount of good transported is 73, 681, 000 tonnes in 1989, increased to 174, 642, 000 tonnes in 2000, the increase is over 237%. The amount of goods, as forecasted by the Board, will continue to increase to 386, 312, 000 tonnes in the year 2020.

2.2 Percentage of goods transported through water

Meanwhile, the percentage of good transported through river and ocean is also the highest in the past ten years, which shares over

1. Appendix 1, Summary Statistics on Port Traffic in Hong Kong as at July 2001 by Port and Maritime Board

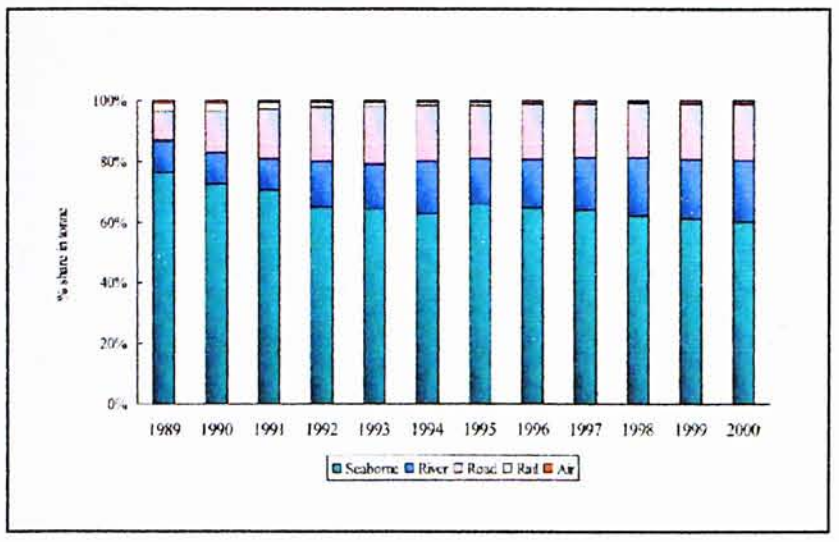

Fig. 2 Distribution of Freight Movement by Mode of Transport

80% of totally goods transported and is much more than those transported through road, rail or air (Fig.2).

To conclude, water transportation play the most important role in the international transportation of Hong Kong. In the near future, it will continue its role and the amount of cargo transported, as foreseen by the Hong Kong Port and Maritime Board, will continue to increase.

3. International Maritime Safety and The International Maritime Organization

3.1 General background and objective of The International Maritime Organization

Shipping is perhaps the most international of all the world's great industries and one of the most dangerous. It has always been recognized that the best way of improving safety at sea is by developing international regulations that are followed by all shipping nations and from the mid-19th century onwards a number of such treaties were adopted. Several countries proposed that a permanent international body should be established to promote maritime safety more effectively, but it was not until the establishment of the United Nations itself that these hopes were realized. In 1948 an international conference in Geneva adopted a convention formally establishing IMO (the original name was the Inter-Governmental Maritime Consultative Organization, or IMCO, but the name was changed in 1982 to IMO).

The IMO Convention entered into force in 1958 and the new Organization met for the first time the following year. The objectives of IMO can be summarized by the phrase:
"Safer shipping and cleaner oceans"

IMO is the United Nations' specialized agency responsible for improving maritime safety and preventing pollution from ships. When the establishment of a specialized agency of the United Nations dealing with maritime affairs was first proposed, the main concern was to improve safety at sea.[2]

3.2 Convention introduced by the IMO

From the time of the establishment of the IMO, various conventions(Table 1) were made and they have gained widespread support throughout the world. Among this convention, it is the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) affects the training-activities of the industry the most.

Table 1

Convention	Number of Parties	% of world tonnage covered
Load Lines 1966	140	98.19
SOLAS 1974	136	98.27
STCW 1978	130	97.55
Collision Regulations 1972	130	96.20
Tonnage 1969	118	97.51
MARPOL 73/78	102	93.48

3.3 Standards of Training, Certification and Watchkeeping for Seafarers

The 1978 Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention was the first to establish basic requirements on training, certification and watchkeeping for seafarers on an international level by IMO. Previously the

2. Extract, from the materials of The International Maritime Organization.

standards of training, certification and watchkeeping of officers and ratings were established by individual governments, usually without reference to practices in other countries. As a result standards and procedures varied widely, even though shipping is the most international of all industries.

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers was established on 7 July 1978 and was in effect on 28 April 1984. The Convention prescribes minimum standards relating to training, certification and watchkeeping for seafarers which countries are obliged to meet or exceed. The existing local Seaman's Training Center in Tai Lam Chung, was established in order to fulfill the STCW requirement.

The 1995 amendments of STCW, adopted by a Conference, represented a major revision of the Convention, in response to a recognized need to bring the Convention up to date and to respond to critics who pointed out the many vague phrases, such as "to the satisfaction of the Administration", which resulted in different interpretations being made.

Some of the important amendments adopted by the Conference include the following:

Parties to the Convention are required to provide detailed information to IMO concerning administrative measures taken to ensure compliance with the Convention. This represented the first time that IMO had been called upon to act in relation to compliance and implementation - generally, implementation is down to the flag States, while port State control also acts to ensure compliance. Under the revised Convention, Parties are required to provide detailed information to IMO concerning administrative measures taken to ensure compliance with the Convention, education and training courses, certification procedures and other factors relevant to implementation.

The amendment also includes some technical innovations, such as the use of simulators for training and assessment purposes have been recognized. Simulators are mandatory for training in the use

of radar and automatic radar plotting aids

For proficiency in survival craft includes mandatory minimum requirements for familiarization, basic safety training and instruction for all seafarers; mandatory minimum requirements for the issue of certificates of proficiency in survival craft, rescue boats and fast rescue boats; mandatory minimum requirements for training in advanced firefighting; and mandatory minimum requirements relating to medical first aid and medical care.

To conclude, IMO is the international organization promoting safety and anti-pollution in the maritime industry. The standard is being upgraded from time to time, including the training and requirement of seafarers. Therefore the method of training, the point of emphasis and the facilities involved also needs to advance with time. For example, the 1995 amendment of the STCW requires simulation for maritime training, which has not ever been arisen before. As a result, the existing training program need to be revised at a regular time interval, so as to ensure that it can cope with the latest standard or even lead the existing standard.

4. Local Training Facilities and Activities

4.1 Seamen's Training Center

4.1.1 General background

The Seamen's training center situated near to the Castle Road, Tai Lam Chung (Fig. 3), is one of the training venues providing training for the merchant navy. It provides training courses for deck cadet officers, new entrant ratings, modular and certificate courses for local or foreign serving seafarers, and emergency response and safety training for employees of marine related shore based industries. The center had equipped itself with various facilities such as various display rooms, radar operation room, first aid room, etc. to let trainees to obtain the essential knowledge.

The establishment of the training center is actually affected by the change of rule of the IMO, The International Maritime Organization's Convention on Standards of Training, Certification and Watchkeeping for Seafarers in 1978. From that time on, the center has been undertaking all necessary steps to give the Convention, as amended from time to time, full and complete effect, so as to ensure that, from the point of view of safety of life and property at sea and the protection of the marine environment. Seafarers on board ships are qualified and fit for their duties. This includes the obligation to make appropriate arrangement for training and certificate.

Fig. 3 Location of the Seamen's Training Center, Hong Kong

4.1.2 Training Provided:

The target groups of the center are deck cadet officers and seamen ratings trained to meet the exacting standards required of ships' crews these days. It also offers refresher courses(Table 2) which are necessary as seamen progress to more senior posts. The training stresses the essentials of safe working practices, discipline and teamwork.

4.1.3 Building and facilities

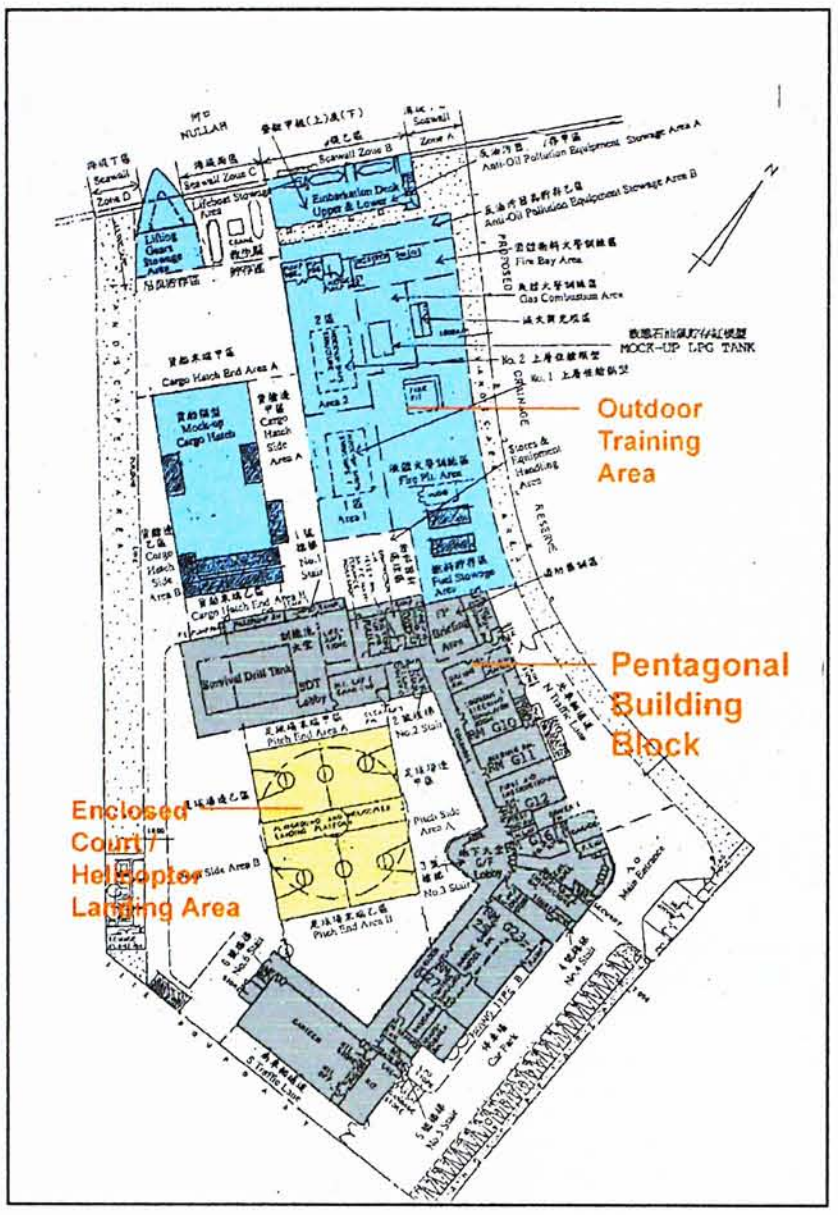

Fig. 4 Ground floor plan, Seamen's Training Center.

The center covers 1.6 hectares and composed of a 3 floors pentagonal building and an outdoor training area(Table 3). The building mass also defined an outdoor basketball court, which is also a landing place for helicopter (Fig. 4).

The center provides basic training for local seafarers in order to comply with the STCW of IMO. According to the spokesman of the center, there is now a lack of simulator facilities in the center, which is being promoted by STCW 95.

The building itself have limited neither ocean nor sea activities as the center is separated from the sea by the near by highway. Though various facilities of maritime activities are equipped inside the center, However, The atmosphere of the center shares no different with other academic school. The site of the center is remote from the access of the public and the activities inside cannot be visible from the other surrounded area (Fig. 3).

Model room for fire fighting.

Lifeboat platform

Survival drill tank

Navigational systems

Fire-fighting equipment

First-aid room

Fig. 5 Facilities of the Seamen's Training Center.

Table 2. Training programs provided by the Seamen's Training Center are listed as follows:

Training Modules	**Duration**
Elementary Pre-sea Training	19.5 days
Personal Survival Techniques	2.5 days
Fire Fighting	5.5 days
Tanker Familization	5.5 days
Basic Seamanship/ Basic Engineering	27.5 days
Proficiency in Survival Craft	11 days
Navigational Watchkeeping / Engine Room Watchkeeping	11days
First Aid at Sea	5 days
Efficient Deck Hand	11 days

Courses for New Entrants	**Duration**
Deck Cadet Officer	2 years
Junior Seaman	16 weeks
Junior General Purpose	23 weeks
Junior Motorman	16 weeks

Table 3: Program of the indoor area, Seamen's Training Center:

Type	**No.**
Classrooms	10
Display Rooms	3
Specialist Workshops	4
Specialist Stores	4
Sick Bay	1
Visual Aids Room	1
Mess Room and Assembly Room	1
Gallery	1
Administrative Offices	Varies
Storerooms	Varies
Dangerous Goods Stores	Varies

Special facilities for training in the Seamen's Training Center:

1. One steel mock-up ship structure, pump room, fire bays, LPG installation and oil pit
2. Survival drill tank equipped with an overhead gantry
3. Bridge simulator with full range of electronic navigational systems, Radars, ARPA, VHF, GMDSS etc
4. Lookout, navigation lights, collision avoidance simulator
5. Engine-room control simulator, oily water separator and emergency fire-pump
6. MacGregor hatch with one 5 tonne swinging derrick and associated winches, spreaders and cargo containers
7. Lifeboat platform fitted with two sets of davits, enclosed and open survival craft and one single arm life-raft davit, plus a further three survival craft, and rescue boats at moorings
8. Full scale forecastle with windlass, anchors and mooring buoy for anchor, cable and mooring work
9. One no. 3 tonne crane on the waterfront
10. Ship's wheel, transmitter and steering motor simulator
11. Various dedicated model rooms for fire fighting, engine-room, survival craft, seamanship, tanker work etc..

4.2 The Hong Kong Marine Department

4.2.1 New training facilities

Fig. 6 Computer graphic portraying the training centre at Marine Department.

According to the newsletter[3] released by The Hong Kong Marine Department, the department is planning to open a new training center at the Government Dockyard, Stonecutters Island in May for training departmental officers.

The 250-square-metre center comprises lecture rooms with audio-visual training aids, a reception area and a student resting area. There is also a full mission ship simulator for the center, which can be used in the early year 2002. The proposed system consisted of a 210-degree horizontal field of view through seven channels projection and a mock up bridge with fully equipped control console. (Fig. 6) The facility is intended to provide training in navigation and to familiarize officers to bridge operation through tailored simulation exercises. In the longer term, the simulation facilities will also be developed to conduct assessment of pilots and other maritime personnel, and planning of port infrastructure.

Apart from traditional training facilities, a Vessel Traffic Service (VTS) training simulator and a Global Maritime Distress and Safety System (GMDSS) training simulator will be installed in the center later 2001 for training VTS operators and supervisors Those who successfully complete the VTS course and assessment will receive a certificate in accordance with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), requirement.

4.2.2 Other safety issues

Other than the establishment of the new training center, there are also several safety issues that the Hong Kong Marine Department focuses on recently. For example, The Hong Kong Marine Department, with the active co-operation of the Hong Kong Shipowners Association, is making substantial contribution towards an international study for the improvement of bulk carrier safety.

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3. Appendix 2, Hong Kong Maritime News, Issue No. 2, 4, 5, Year 2000-2001

The study, based on Formal Safety Assessment (FSA) principles and being coordinated by the International Project Steering Board, is due to be concluded by December 2002. It will have far-reaching impact on the regulatory regime governing bulk carrier safety.

Various drills were also carried out by the department, which includes search and rescue drill for high-speed vessel collision, and oil pollution control exercise of grounded tanker, which resulted in oil spill. The drill for high-speed vessels aimed at testing the communication efficiency between the rescue coordination center and the high-speed ferries during emergencies, the emergency procedures on board vessels, as well as the coordination center's searching-and-rescue contingency plan. For the drill oil pollution control exercise, it is used to test the ability, limitation and contingency in boom deployment, clean-up application and communication, and to seek possible enhancement in future response strategy.

Drills and exercises are used to test the effectiveness and ability of the current plan and organization in the Marine Department. Meanwhile, training facilities are updated to meet the up-to-date requirement.

Fig. 7 Oil spill control exercise carried out by the Maritime Department.

5. Overseas Training Example- The Jovellanos Integral Maritime Safety Center

5.1 General background

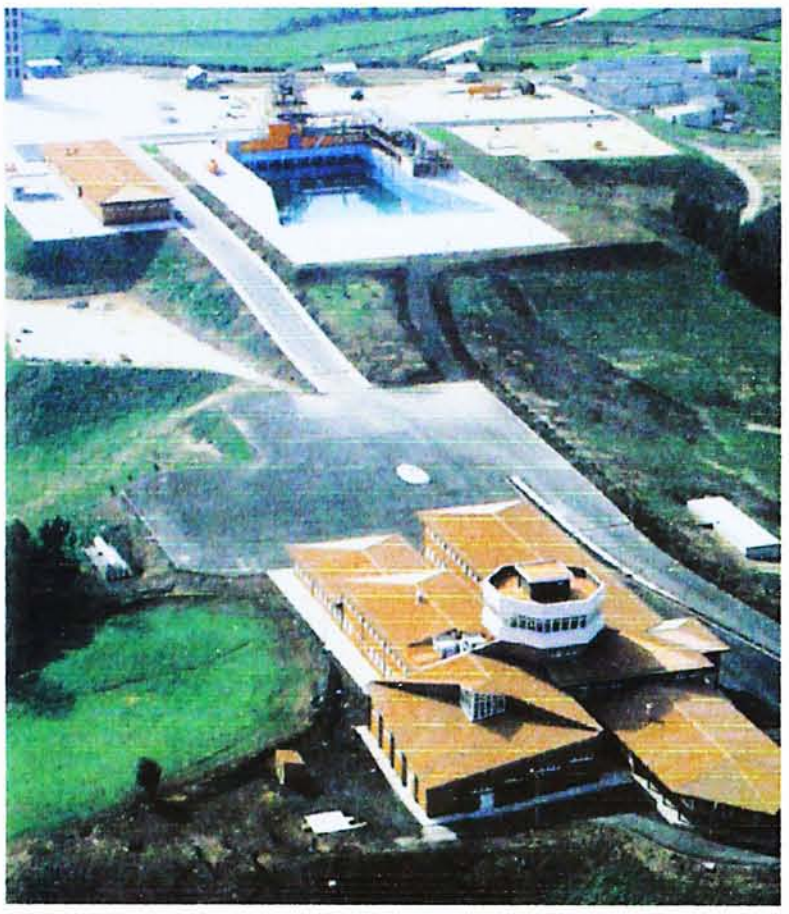


Fig. 8 Aerial view of the Jovellanos Integral Maritime Safety Center

The Jovellanos Centre, which covers an area of 143,000 m², is located in the municipal area of *Gijón*, in the Principality of *Asturias*; built on a hilltop, it overlooks the city and the Port of *El Musel.*

It was inaugurated in May 1993, depends on the *Sociedad de Salvamento Seguridad Marítima* (National Society for Lifesaving and Safety at Sea), which is incorporated in the Ministry of Public Works, through the *General Directorate of the Merchant Marine*. The center has five aims, which includes:

1. To give training that complies with the applicable standards and in accordance with the needs of the users.
2. To provide the knowledge required to successfully accomplish the tasks to be carried out in the work place.
3. To reduce injuries, loss of life and damage to the environment, through training in risk and accident prevention.
4. To foment the use of new technologies in training, in the fields of safety and the environment.
5. To guarantee the application of the quality system to the design and development of training activities.[4]

5.2 Function of the center

The center provide training which focused on three main areas, which are safety, maritime-port context and environment and their detailed objectives are as below:

SAFETY

Courses providing integral training in safety techniques on land, designed for: fire-fighters, emergency brigades, civil protection,

4. Extract, from the materials of the Jovellanos Integral Maritime Safety Center

personnel working in hotels, hospitals, administrative and commercial centers and all those who, by reason of their work, may have to co-ordinate an emergency or control the outbreak of fire .

MARITIME-PORT CONTEXT

In this area, the Jovellanos Centre of Integrated Maritime Safety organizes courses applying high value added methodology and training tools, with the aim of perfecting professional skills and promoting adaptation to changes in technology.

ENVIRONMENT

An important aspect of the activities is related to ecological catastrophes, frequently caused by accidents; appropriate training can help to prevent, or at least minimize, casualties and damage.

Other than providing training, the Jovellanos Centre is also an authorized body for the certification of compliance with Community Directive 89/686, which defines the conditions for marketing and the free circulation of protection equipment within the Community. It issues EC inspection certificates for individual protection equipment designed to protect against drowning and to enhance floatability. (life-jackets, life-buoys, etc.)

5.3 Facilities

As a safety training center, the Jovellanos Integral Maritime Safety Center has equipped with various of facilities for training needs, which included simulators, fire training fields, a survival pool etc.(Table 4)

The nature of The Jovellanos Integral Maritime Safety Center is quite different from a normal seamen-training center. It provides training not only for seafarers, but all personal who are related to

the maritime safety affairs. Also, the center is responsible for issuing licenses for the life-saving equipment, which is an authority for maintaining the standard of life-saving goods. Other than that, the port-control simulator is also used to improve the facilities and controlling management of some seaports. It is used as a tool for research. Therefore, the center is not only a place for seafarers' training only, but it also play a role in maintaining and advancing the standard of maritime safety.

Fig. 9 Computer simulation in the center.

Fig. 10 Fire-fighting field and survival pool of the Integrated Maritime Safety Center

Table 4: The details of facilities in the Jovellanos Integral Maritime Safety Center are as below:

I. SIMULATORS	Various simulators are used to practice vessel control, port control and anti-pollution exercise. The computer based simulation help the trainee to experience the situation of various situations, which is hard to create in a real time situation.
1. Communications simulator	This is designed to provide training in communications, based on the Global Maritime Distress and Safety System.
2. Maritime traffic service simulator	It facilitates VTS operator training on real consoles, through exercises using radar scenarios; these are essential to enable students to learn to carry out traffic control tasks efficiently and safely.
3. Maneuvering and navigation simulator	It facilitates the improvement of maneuvering and navigation techniques.
4. High speed ship simulator	Similar to the maneuvering and navigation simulator but applied in a high speed vessel situation
5. Simulator of anti-pollution measures	The simulator include several module for oil spill control, which includes: Mathematical module: It predicts the behavior of an oil slick at sea, taking into account the chemical characteristics, wind conditions, currents, air and sea temperature. It provides information about the size of the oil spilt, the amount evaporated, dispersed or emulsified, as well as the quantity retained with booms or recovered by skimmers. Information module: Database of all the resources available to combat pollution. It monitors the expense of the operations and generates images of the accident zone. Navigation module: Consoles that allow the instructors to interact with the whole system: steer vessels, deploy barriers, mobilize resources and control the development of the exercise. Helicopter and vessel consoles.

II. FIRE-FIGHTING FACILITIES	There is a fire-field in the center equipped with various setups to simulate different fire conditions.
1. *Installations for early response team*	Fully equipped 25 and 45-mm diameter fire hydrants. Installations for practice with portable fire extinguishers. Very steep inclined plane, ramp with retaining basins, fires in circular and rectangular trays. Inclined plane for fires in three dimensions.
2. *Practice tower and multipurpose building*	Basement with vehicle ramp, garage, car park and smoke-filled labyrinth. Goods store. 2-storey dwelling and flat with 3 rooms, hall and bathroom. Tower with 6 floors; staircase with vertical fire-fighting water conduct; rooms with steel-sheet clad walls; open gallery accessed by ladder, outside fire-escape; walls with protruding blocks for free climbing exercises: 4 models of cabins, holds and engine room.
3. *Fires in enclosed spaces*	Fire practice building with store and dwelling for practicing fire fighting and ventilation. Fire of flammable liquids inside metal structures where high temperatures can be generated (pump room). Fires in containers. Installations where the techniques required to extinguish fires in enclosed spaces are applied, and where explosions caused by fumes are controlled.
4. *Chemical tower*	A typical installation with leaks of gas and flammable liquid; there are 3 floors above ground containing piping, valves and connections to a distillation column in the center.
5. *Fires in gas lines*	Gas leaks at ground level. Gas jet projected against the wall. Horizontal and vertical gas jets. Christmas Tree (fire in multiple directions). Conventional type LPG tank. Gas leaks in enclosed spaces and pump rooms (microwaves). Fire at hose connection rack.
6. *Freeing and rescuing trapped victims*	Rescue of traffic accident victims trapped in vehicles. Use of rescue equipment (shears, separators, air cushions). Rescue of victims from wells and grain silos. Rescue of victims trapped in blazing buildings. Rescue of victims from tanks and from other confined spaces.

7. *Flammable liquid fires*	Cross-shaped basin (11.28 m^2. and 5,640 l.). Platform with 4 pillars and vessels on two levels at a height of +2.45 m. Half-cylinder shaped basin with a combination of gas and diesel oil. 25,000 l. tank for loading tanker lorries; vehicle and 225 m^2 retaining basin.
8. *Chemical tower. Fixed and floating roof storage tank. Pipe rack for hose connection.*	Wells with a depth of 10 m. and a diameter of 2 m. for liquid pumping and transfer practice (simulations of rescues from wells and grain silos). Fires in exterior bilges. Water cannons with flow-rates of 3,000 liters/minute. Fire hydrants with 70-mm. outlet.
9. *Combustible liquid storage tank*	Fire-fighting practice in fixed- and floating-roof tanks. Surface and subsurface flooding with foam. Use of water cannons.
10. *Hazardous goods*	10 x 20-m. storage shed. Handling grouped cargo packages containers and portable tanks. Practice in stowage, segregation; fighting fires inside and outside containers. Practice with different kinds of packaging. Rigid-chassis tanker trucks and tanker trailers. Tanker containers. Spillage from piping rack. Practice in the control of liquid spills, from pipelines and storage tanks; use of specialized equipment; NBC protective clothing; sealant strips and cushions for plugging leaks.
SURVIVAL POOL	In the center, there is a 11.20 m. deep pool, with 16 types of waves of up to 1.6 m, surrounded by ship sides with a height of 4.30 and 7.60 m. Around the pool there are emergency exit ramp hoisting device for free-fall lifeboat, boarding area at a height of 14 m, lifeboat on derricks, 7.40 m. escape chute to sea level, inclined planes, nets for abandoning ship, ladders and diving boards at heights of 2 and 5.5 m.
PROFESSIONAL DIVING	There is a decompression chamber and a 12-m. deep floodable diving chambers in the center. It is used to practice in confined (reservoir) and open waters for underwater search and localization of casualties.

6. Proposed Design Brief and Site Consideration

6.1 Design brief

6.1.1 Maritime safety academy

The proposal for the thesis is a maritime safety academy(Table 5), which provides facilities and training modules for both the local and international personnel who are responsible for maritime safety. The main users of the academy will be rescuers, port controller, officers of vessels etc.

6.1.2 Public Interface

Meanwhile, in order to gain the public awareness and interest of the maritime activities, visitor area is introduced for the general public to have a chance to witness what maritime activities are about.

6.2 Site selection

6.2.1 Site selection criteria

i. Nuisance to neighborhood

As the center need to carry out various drills such as fire drill and survival drill, there may be some nuisances to the surrounding area. Therefore the site should be a placed away from the functions which require a quiet environment.

ii. Visual connection to sea:

The center symbolize the advance achievement or leading position of the place in the maritime activities, therefore if it is situated in a location which is eye-catch to the passing vessels, it reminds people the important role of the port in Hong Kong.

Table 5: The draft design brief of the maritime safety academy are listed as follows:

Function	Capacity (Person)	Area (sq. m)
I. Safety Centre Facilities		
Class Rm	180	480
Library	Varies	320
Simulator Rm	80	320
Navigation Training Rm	80	480
Cafeteria	120	330
Administrative Office	25	180
Outdoor Pool	Varies	300
Fire-fighting Field	Varies	500
First Aid Laboratory	80	320
Fire-fighting Laboratory	80	320
Pier	Varies	400
II. Public Interface		
Orientation Rm	Varies	200
Gallery	Varies	400
Information Centre	Varies	400
Canteen	Varies	300

iii. Visual connection to general public

Lot of drill and demonstration will be carried out in the center and the atmosphere can be impressive. It can be events which people would have interested to look at. Therefore it is desirable that the center is visible from the public or major circulation.

iv. Clear to access from sea and aircraft

Aircraft and vessels are being used in the drill, therefore the site should be reachable from both sea and air.

v. Suitable size of flat area

As there are wave-pool and fire-training field equipped in the center, it means that the center occupies quite a large footprint. The site chosen should be large enough to house the center and allow extra area for expansion.

Based on the above requirements, a site at Sheung Wan near to the Western Harbor Tunnel is selected and used to demonstrate the design (Fig. 11).

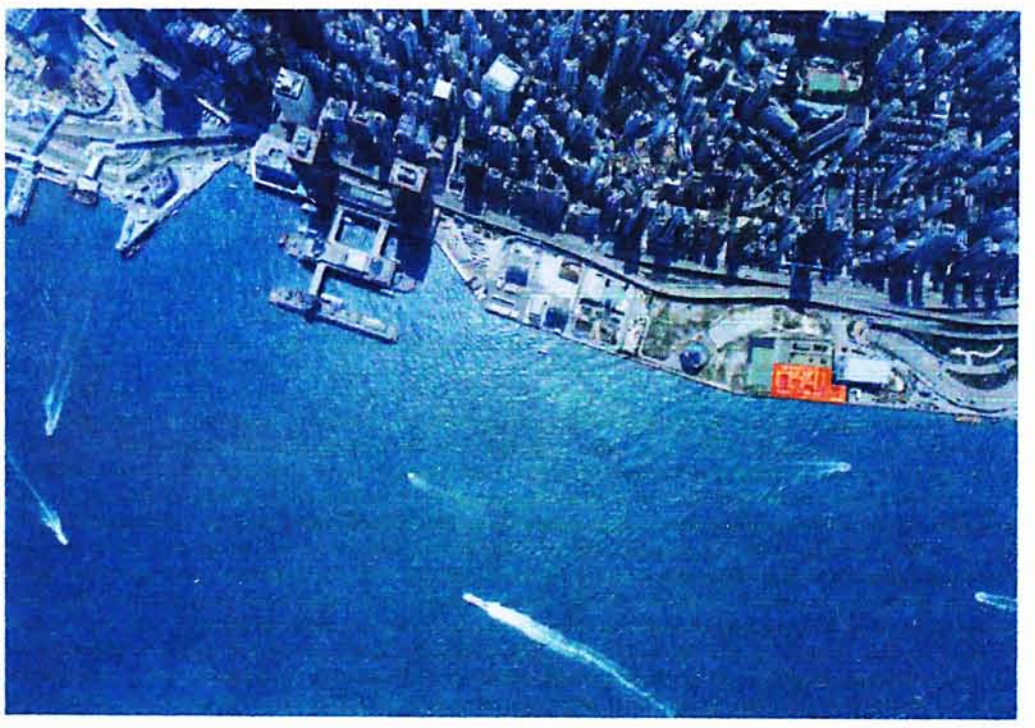


Fig.11 The red zone indicates the location of the selected stie.

6.2.2 Site characteristics

The site is characterized by the following qualities:

As the site is near to waterfront, therefore various water traffics inside the harbor can be observed. On its right there is a ferry pier

a. Nearby water traffic.

b. Public sports facilities

c. Highway system isolated the site.

Fig. 12 Site characteristics

at the Shun Tak Center, which make the site the most visible areas in the harbor along the ferry route (Fig. 12a). At the north of the site it is the Stonecutters Island, at is northeast there located the Yau Ma Tei Typhoon Shelter and at its northwest it is the vessels anchorage area. Those means the northern part of the site is full of maritime activities, which can be seem from a distant.

As the site is a reclaimed land, therefore it had not been very well development and it is being separated from the old urban fabric. The fly-over separated the site from the urban context and the site is no public traffic provided in the site (Fig. 12c). However, as the reclaimed area is a flat land, therefore the site together with the harbor scene is very visible form the highway and also the high-rise buildings behind.

The only facility that exists in the site is a massive sports complex and several sports fields. People would not access the site unless they are the users of the sports complex or the people who are interested in fishing at the harbor front. Therefore the activities inside the site is mainly leisure-based (Fig. 12b).

Fig. 13 Highway and high-rise at the southern part of the site.

Fig. 14 There is near and distant water traffic near the site, and sports facilities is the only existing structure in the area.

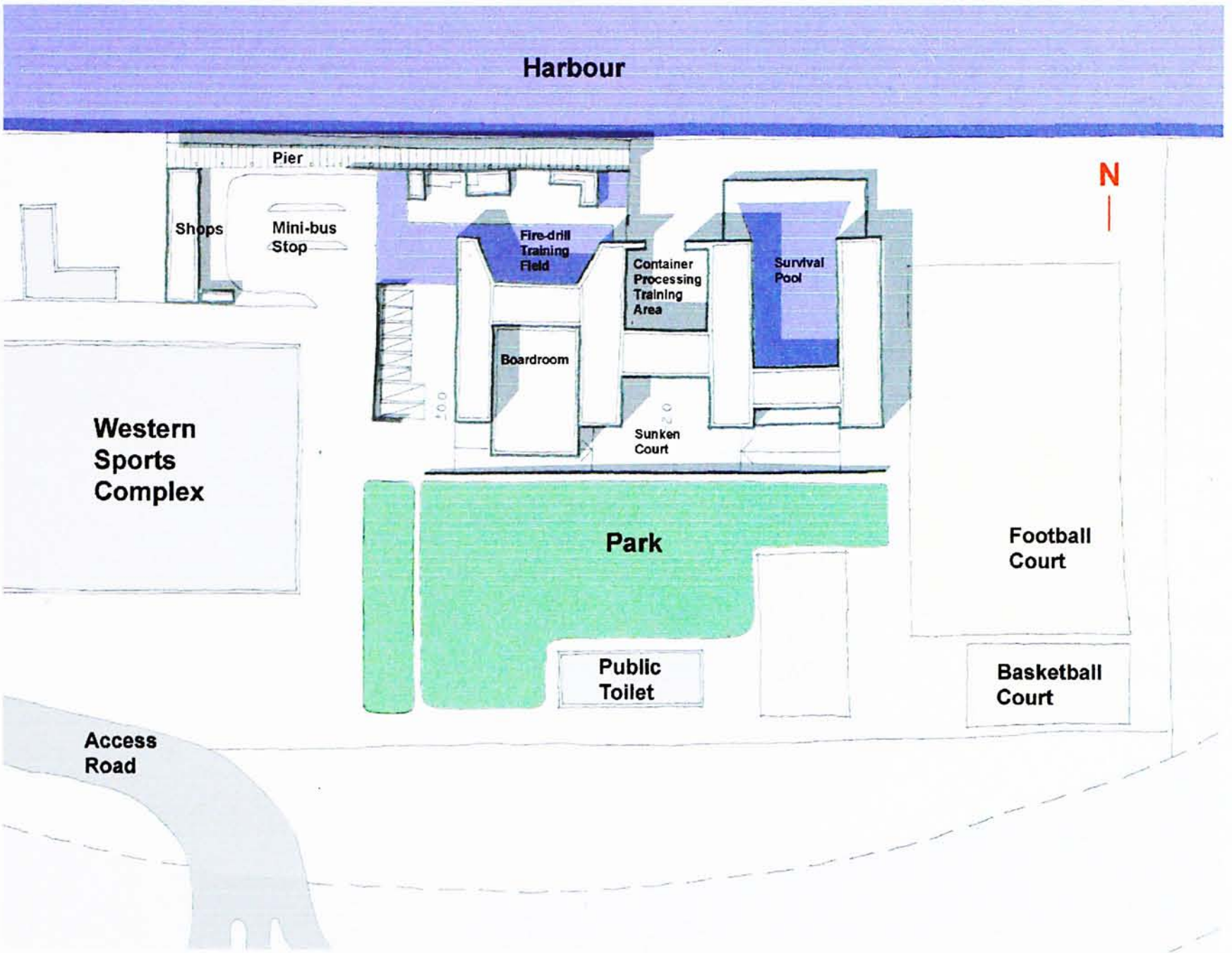


Fig. 15 Site layout of the design

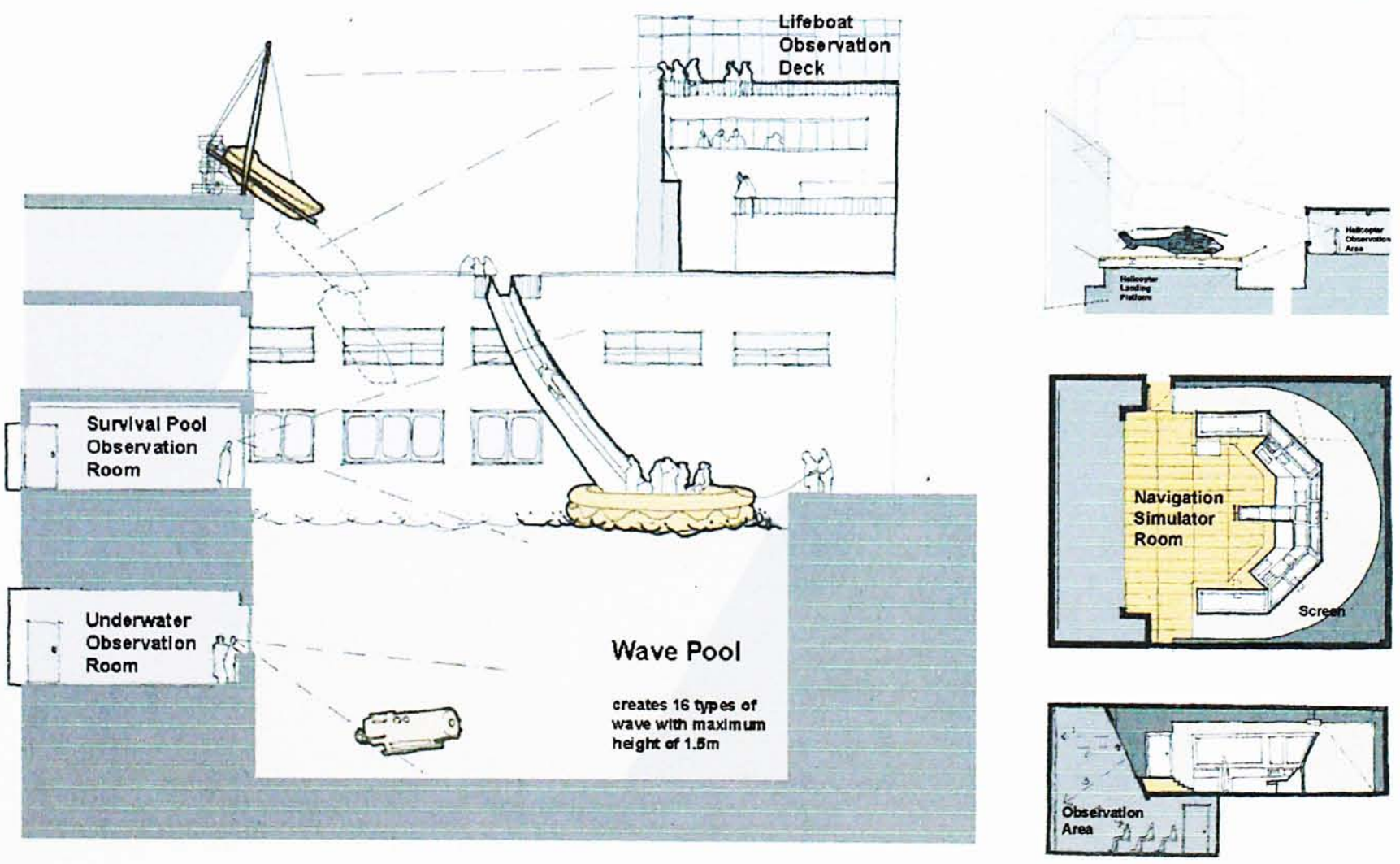
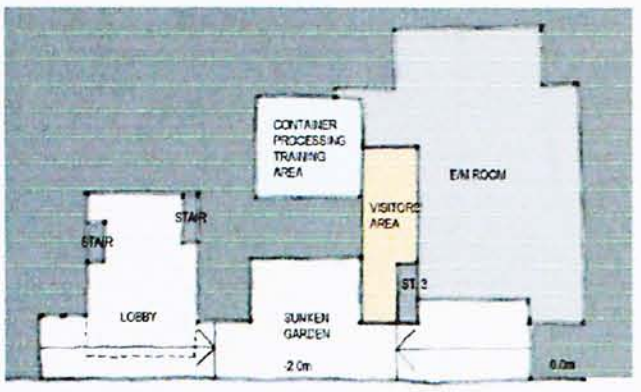


Fig. 16 Sketches of the environment inside the academy.

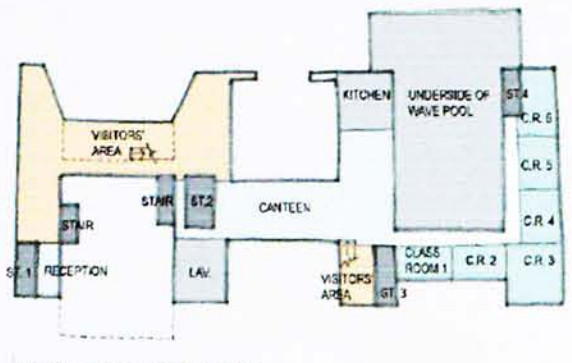
7. Preliminary Design

7.1 Building form

As there is a need for various sizes of outdoor areas for the academy, the preliminary design is composed of several building blocks which create pocket areas for outdoor activities. The three outdoor areas in the design is used to house the survival pool, the fire drill area and the container processing training area (Fig. 15). The building is also divided into frontal and rear parts with the outdoor areas located at the north, which avoid nuisances from affecting the park users at the front. Also, the frontal area tries to project a family image to the public park, which can encourage the public to visit the academy (Fig. 16).

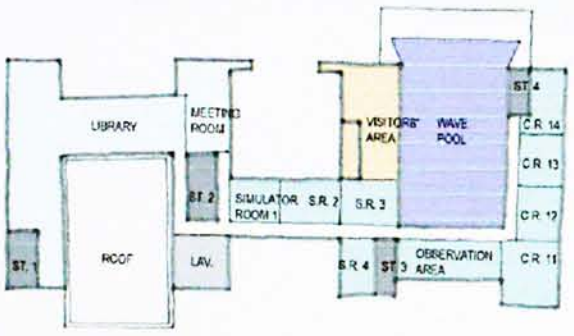


BASEMENT PLAN 1 : 500



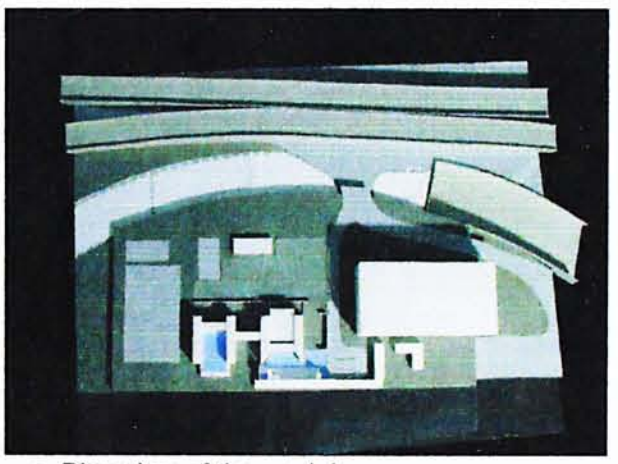
GROUND FLOOR PLAN

FIRST FLOOR PLAN

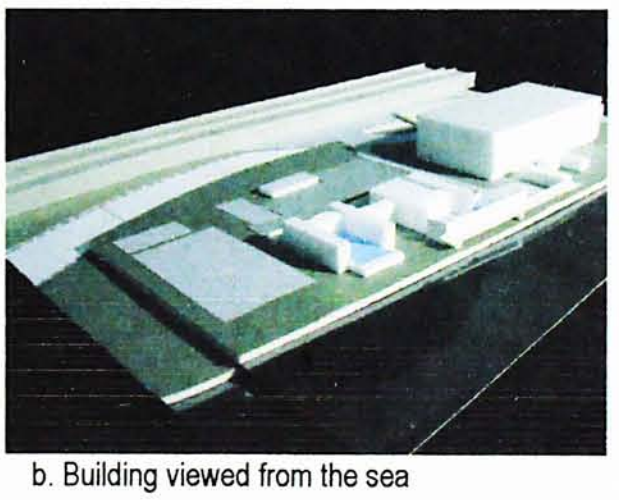


SECOND FLOOR PLAN

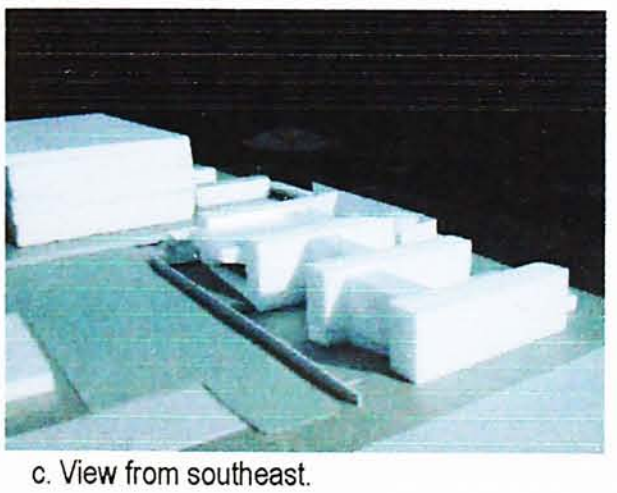
Fig. 16 Plans of various floor.



a. Plan view of the model

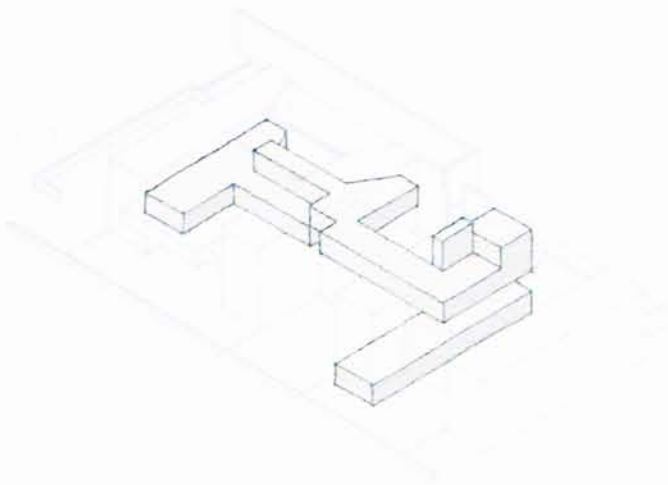


b. Building viewed from the sea

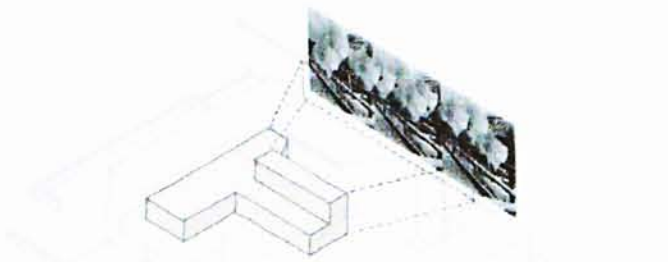


c. View from southeast.

Fig. 17 Model photos of the preliminary design

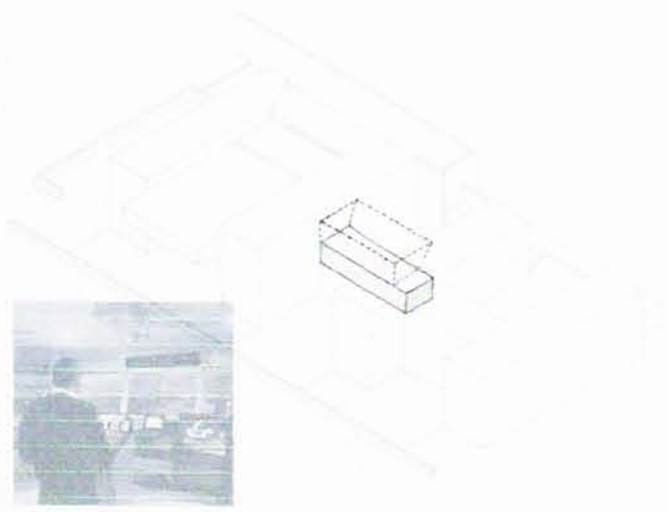


a. Visitor center through the building.



b. Fire-drill observatory

c. View for container processing training area.



d. Navigation simulator

Fig. 18 Sequence in the visitor center.

7.2 The visitor center

Apart from the school, the visitor is made an integral part of the program, which is composed of several observatories inside the academy to see various demonstrations and real time drills inside the academy. The purpose is to allow the visitors to have an understanding about different phenomena that happened at the far-reach ocean. The rooms are distinguished by different views that the visitors can see in the visitor center, which includes the fire-drill observatory, container processing observatory, navigation simulator observatory, wave pool observation area, helicopter viewing area and the underwater observation area. The sequence begins at the visitor center lobby and ends at a sunken courtyard next to the public park, in which exhibits of the major maritime accidents are displayed.

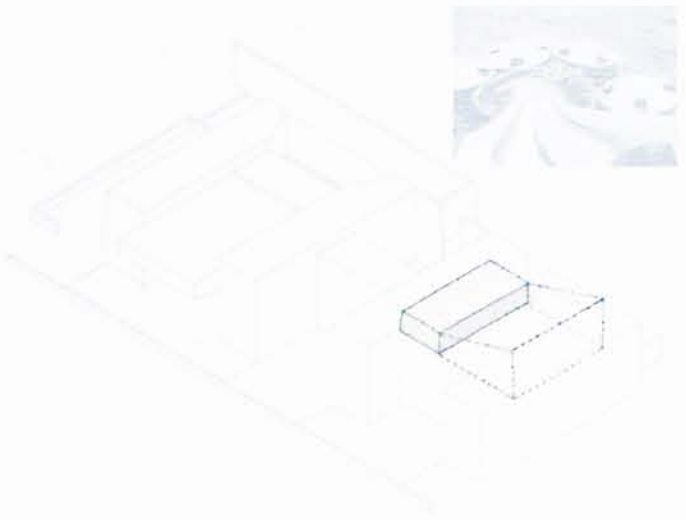
7.3 Entrance

The entrance of the visitor center and the academy are separated. The visitor center is entered from the western side next to the sports complex while the academy lobby is at the southwestern corner under the boardroom, which is also a gathering area for the boardroom.

7.4 Access

As there is no public transportation provides for the site, therefore a mini-bus station is introduced which provides lift for the people from the nearby MTR station to the site.

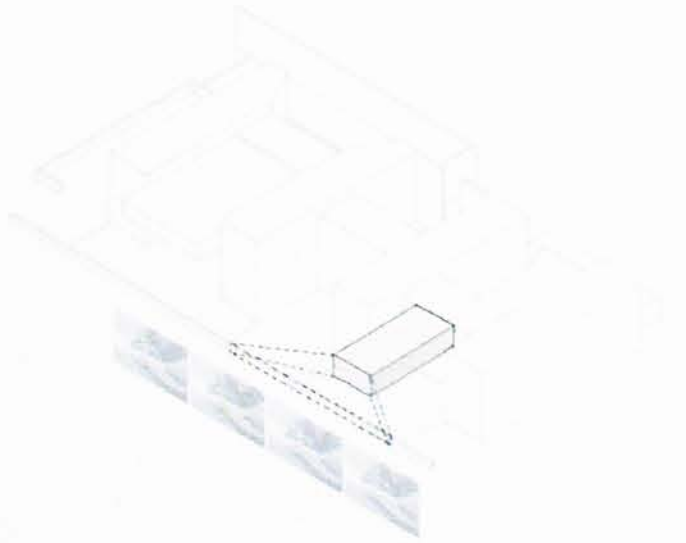
In order to allow water access to the site, a pier is made at the waterfront area which allow the trainees to aboard any vessels. The pier is also a viewing platform for the public on which they can enjoy the waterfront view of the area.



e. Wave pool observation area

f. Helicopter viewing area.

g. Underwater observation area.



h. Viewing history of major accidents at sea.

Fig. 18 Sequence in the visitor center

The main aims of the design is to provide a place in which the visitor can have an understanding of maritime activities, meanwhile the flow of visitors will not interfere with the academy. By doing that the building can fulfill the requirement of training use, while acting as a place for public education of maritime affairs, which is lacking in the territories.

8. Design Development

8.1 Spatial relationship of the academy and the public interface

In order to let the public have the chance to understand more about maritime activities, the academy will also provide a public interface for the public to witness various events held inside the academy. The flow of the public inside the academy would not interfere with the normal operation of the academy and some common facilities in the academy such as the information center and the canteen will be shared with the public. By putting the public flow and the academy together it is expected that people can have a better understanding of the field and safety training in water activities can be promoted.

The program for the public interface includes galleries, information center and a canteen. People can go to the center with their own aims such as information searching, enjoying food near to the harbour front or looking at artifacts displayed in the gallery area. The academy increases the interest of the public interface as various activities inside the academy can be seem by the users of the public interface. The relationship of the two programs is a "casual relationship" which means the two different users in the building can see each others without interfering the activities of each others. (Fig. 19-21)

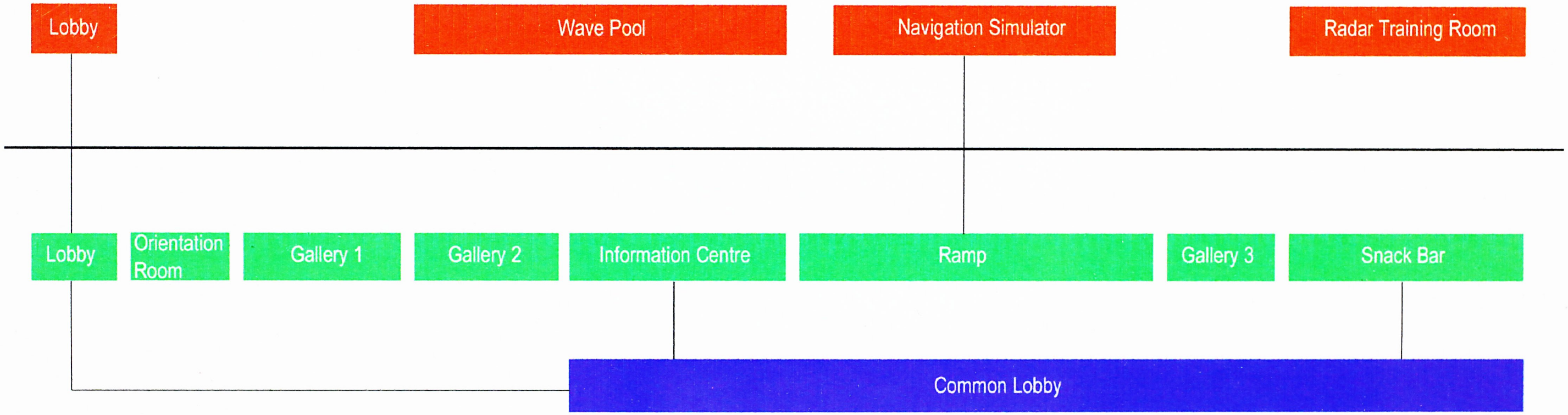
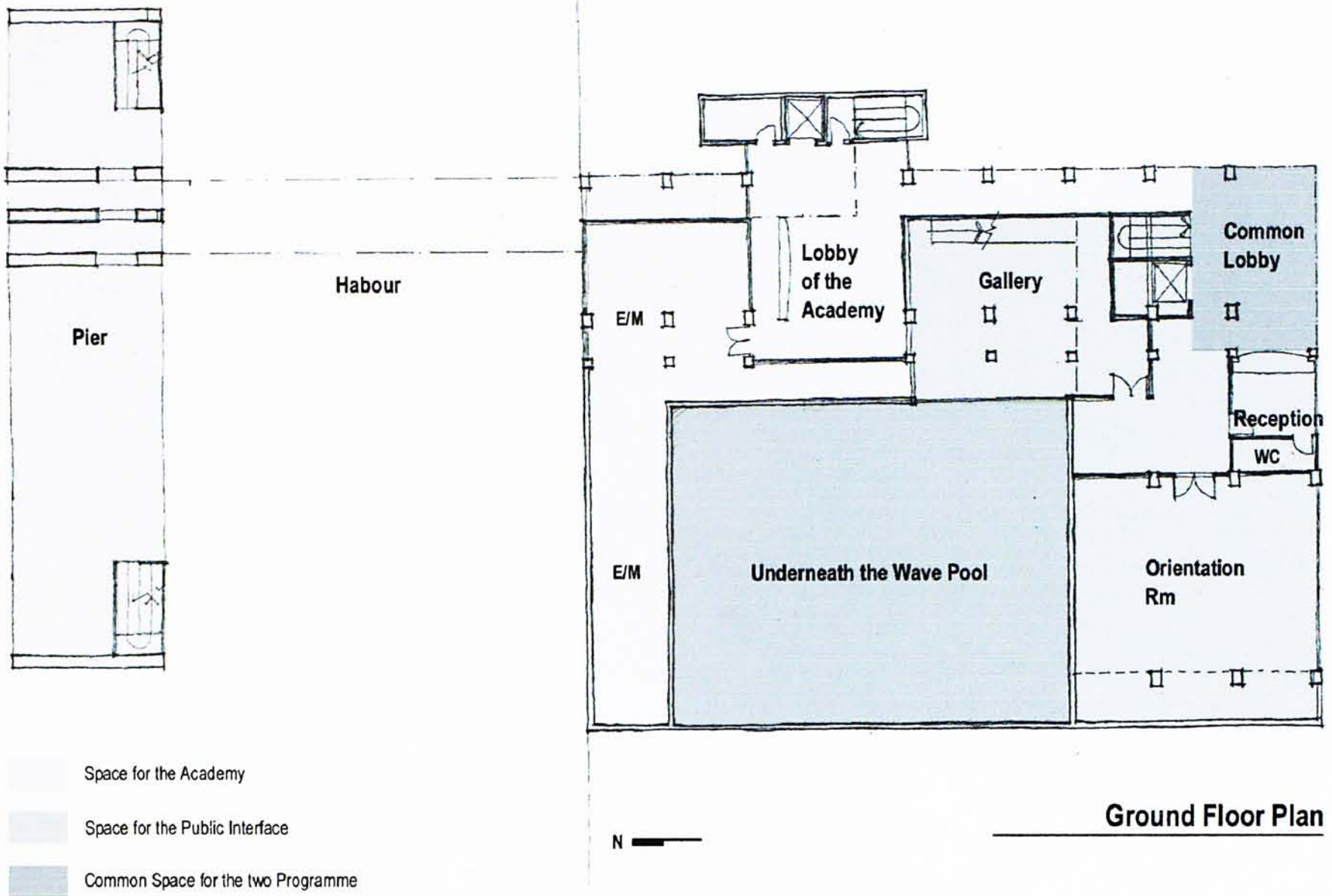


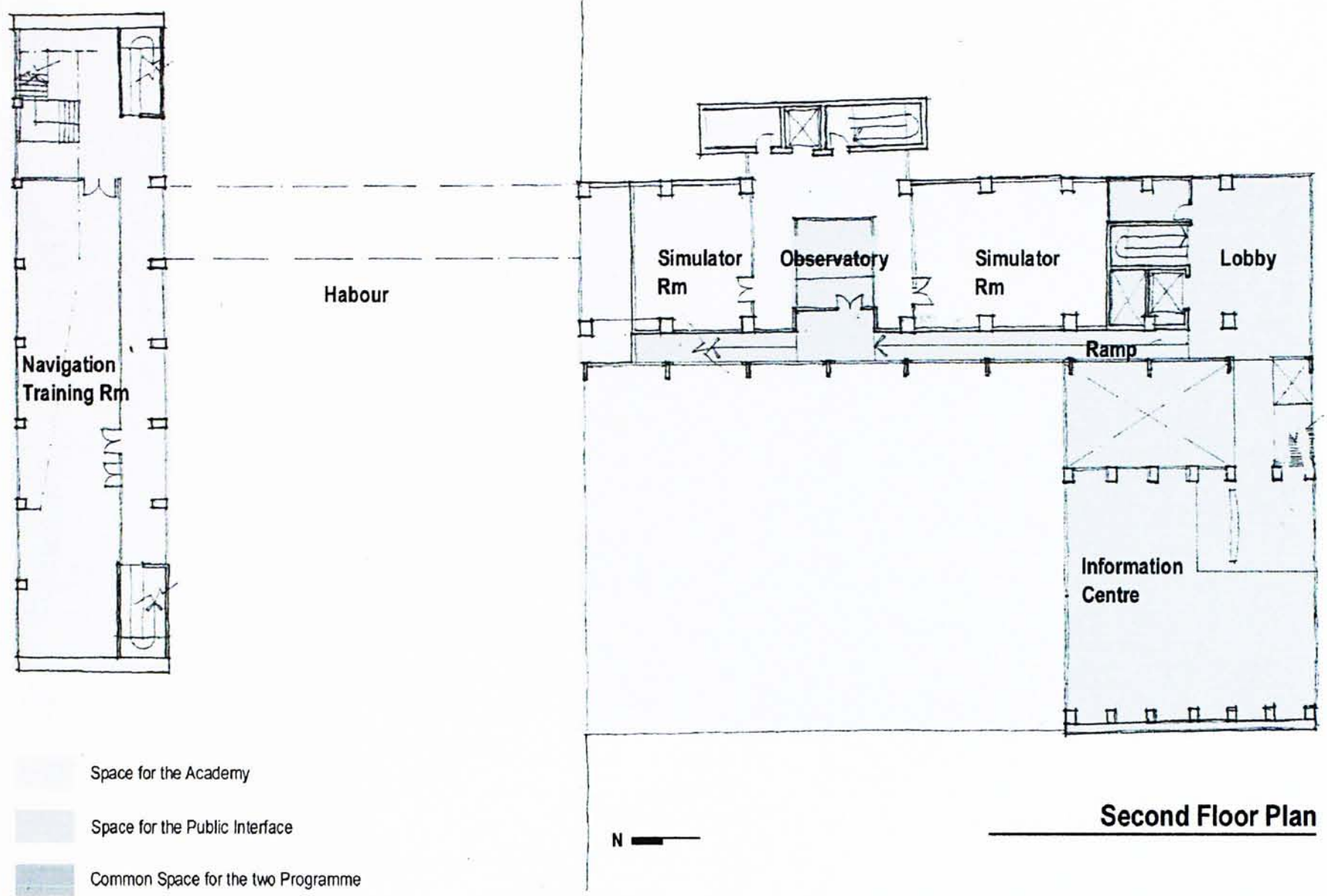
Fig. 19 diagram of the spatial relationship of the two programs

Fig. 20 Plans, Ground to Sixth Floor



Ground Floor Plan

First Floor Plan

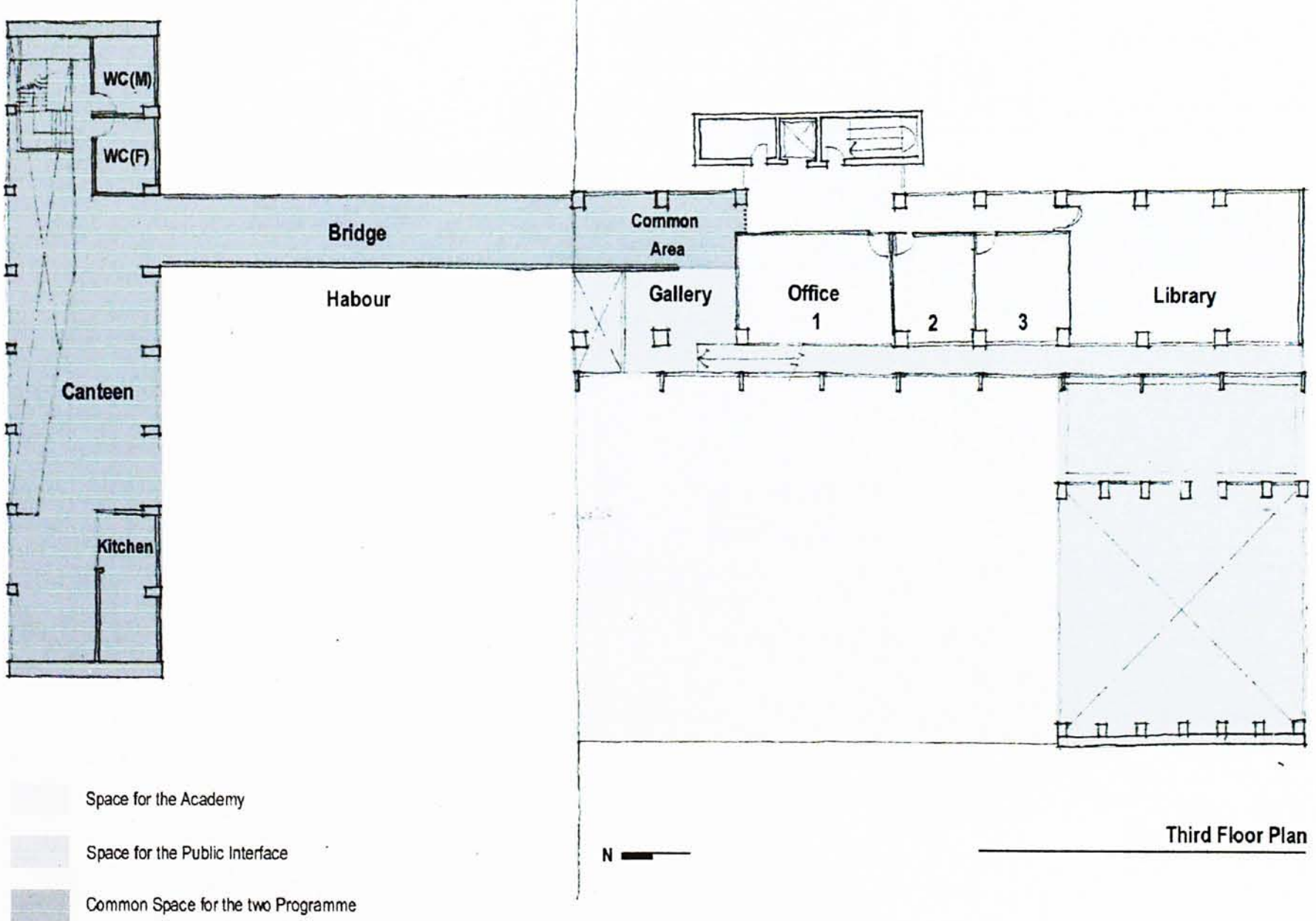


Space for the Academy

Space for the Public Interface

Common Space for the two Programme

Second Floor Plan

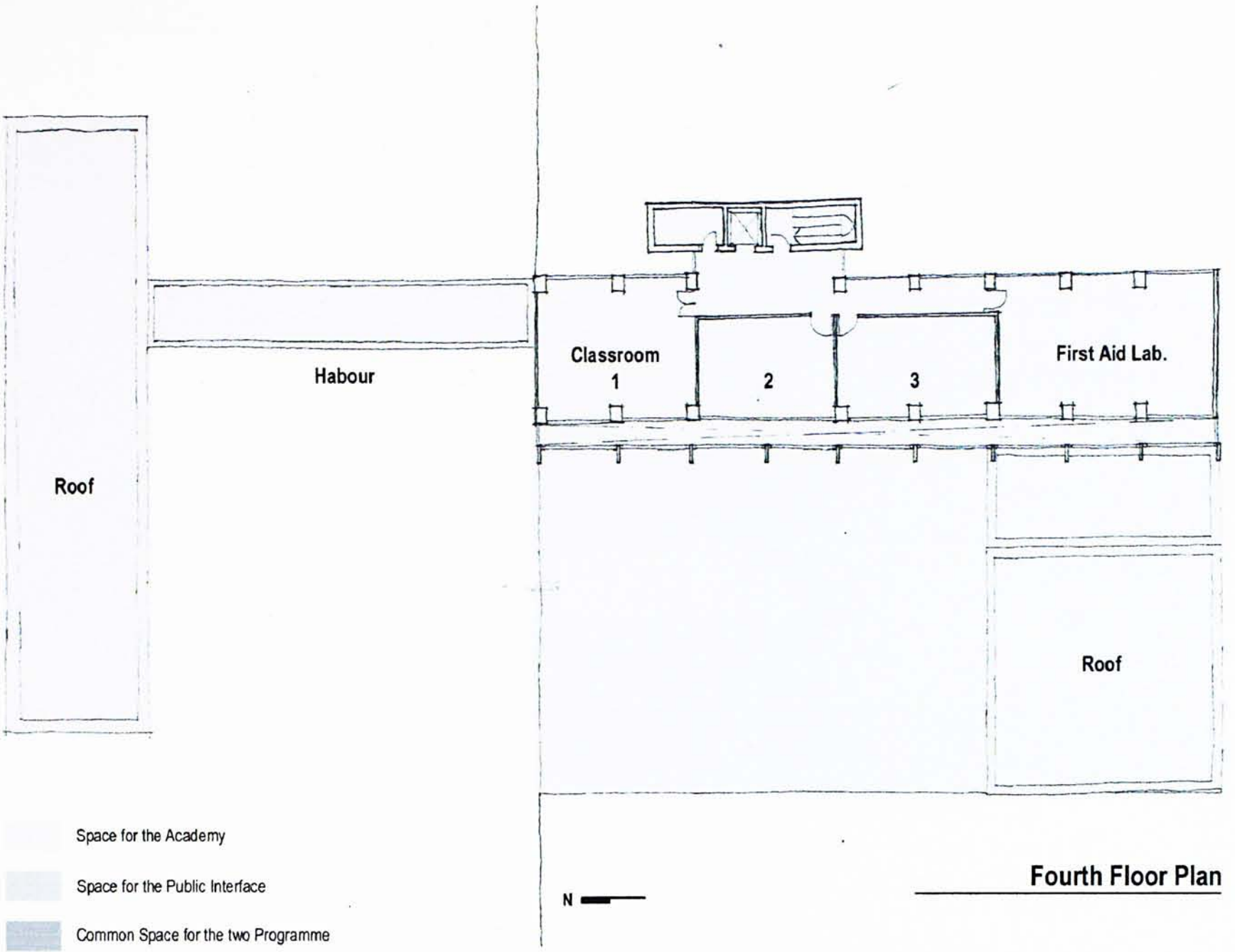


Space for the Academy

Space for the Public Interface

Common Space for the two Programme

Third Floor Plan

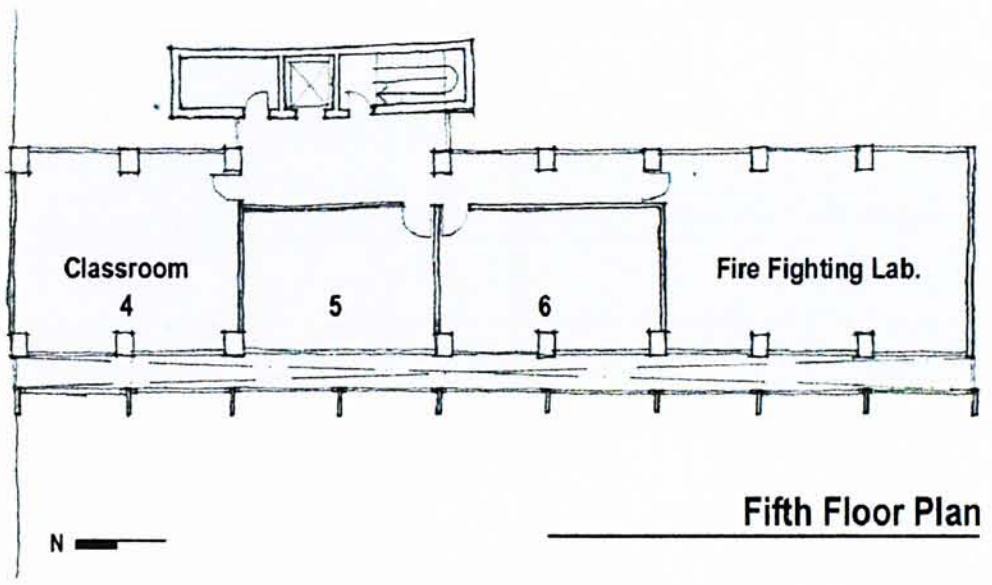


Space for the Academy

Space for the Public Interface

Common Space for the two Programme

Fourth Floor Plan



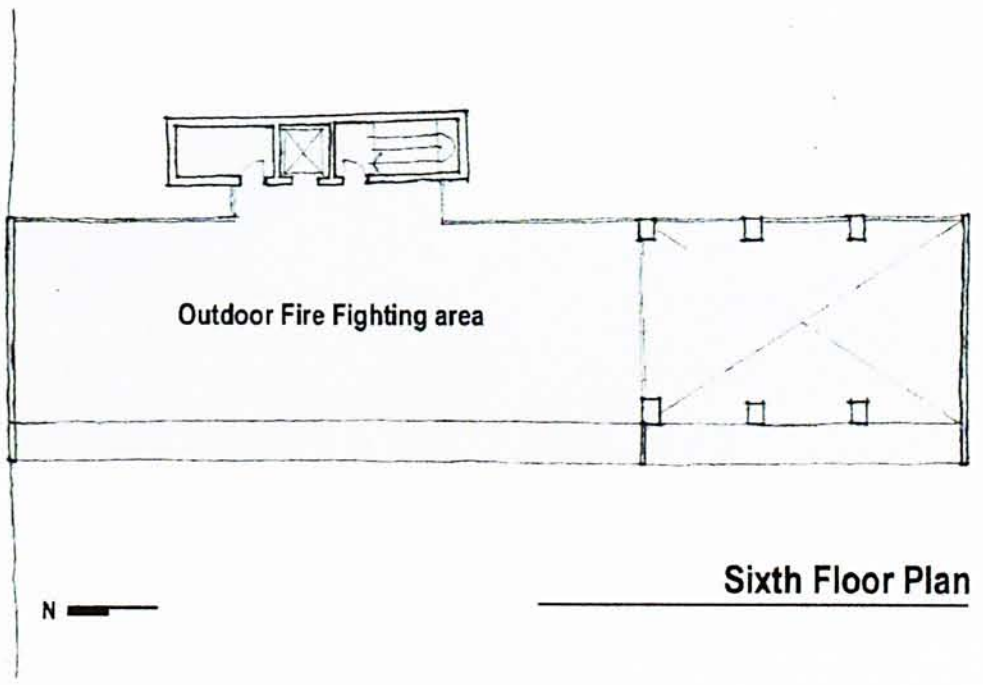
Habour

Space for the Academy

Space for the Public Interface

Common Space for the two Programme

Fifth Floor Plan



Habour

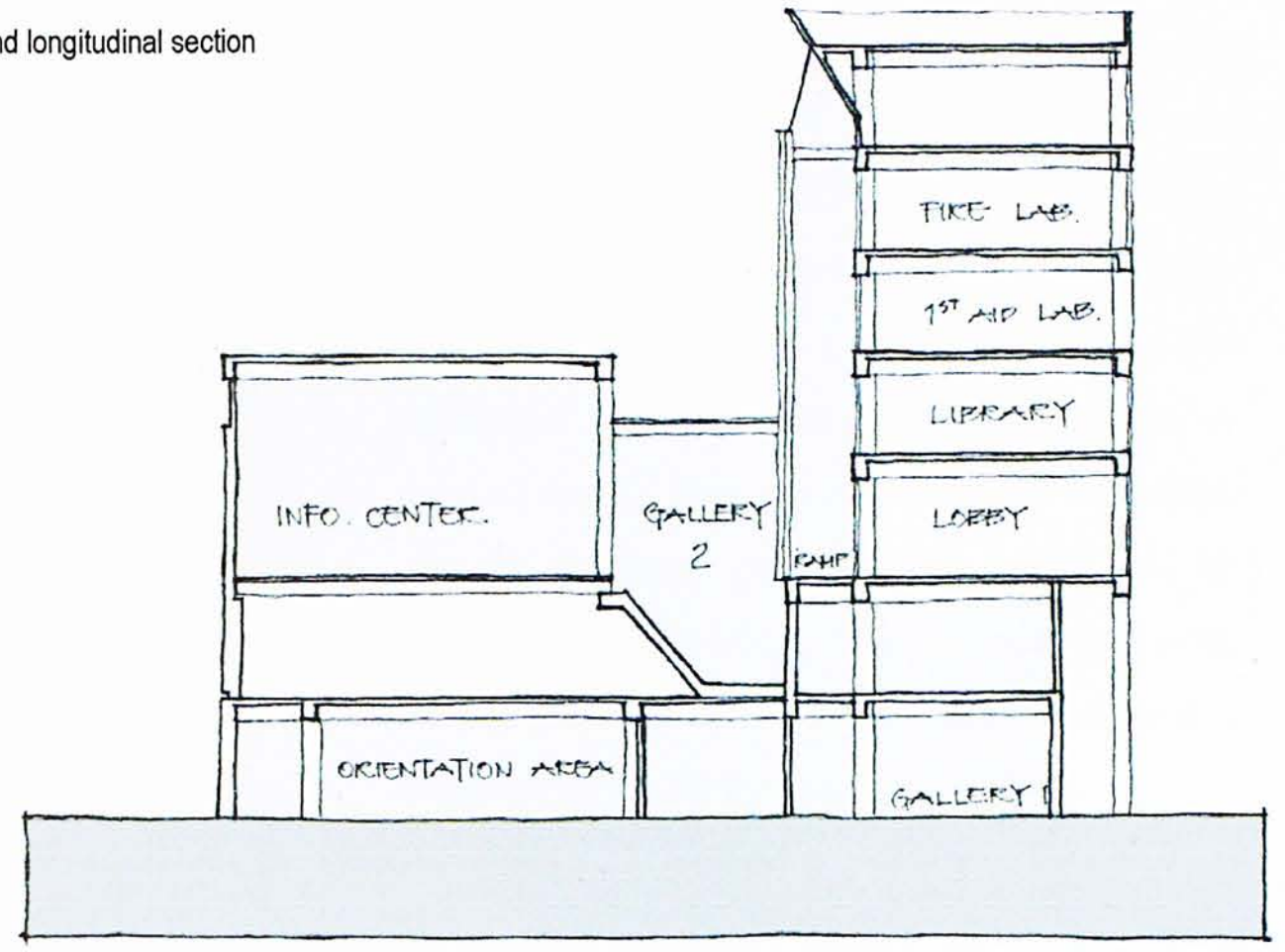
Space for the Academy

Space for the Public Interface

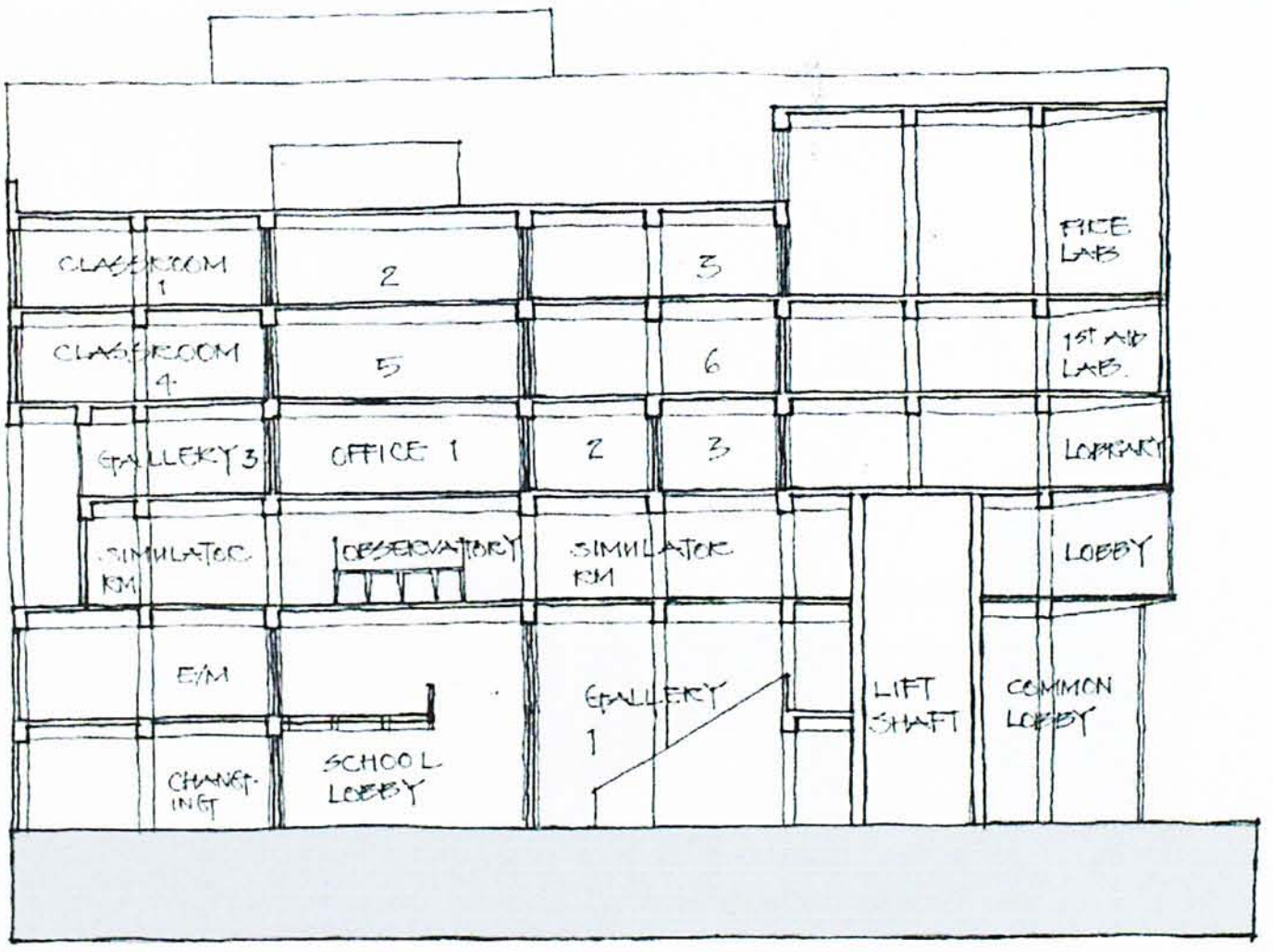
Common Space for the two Programme

Sixth Floor Plan

Fig 21 cross section and longitudinal section



Cross Section



Longitudinal Section

Space for Public Interface

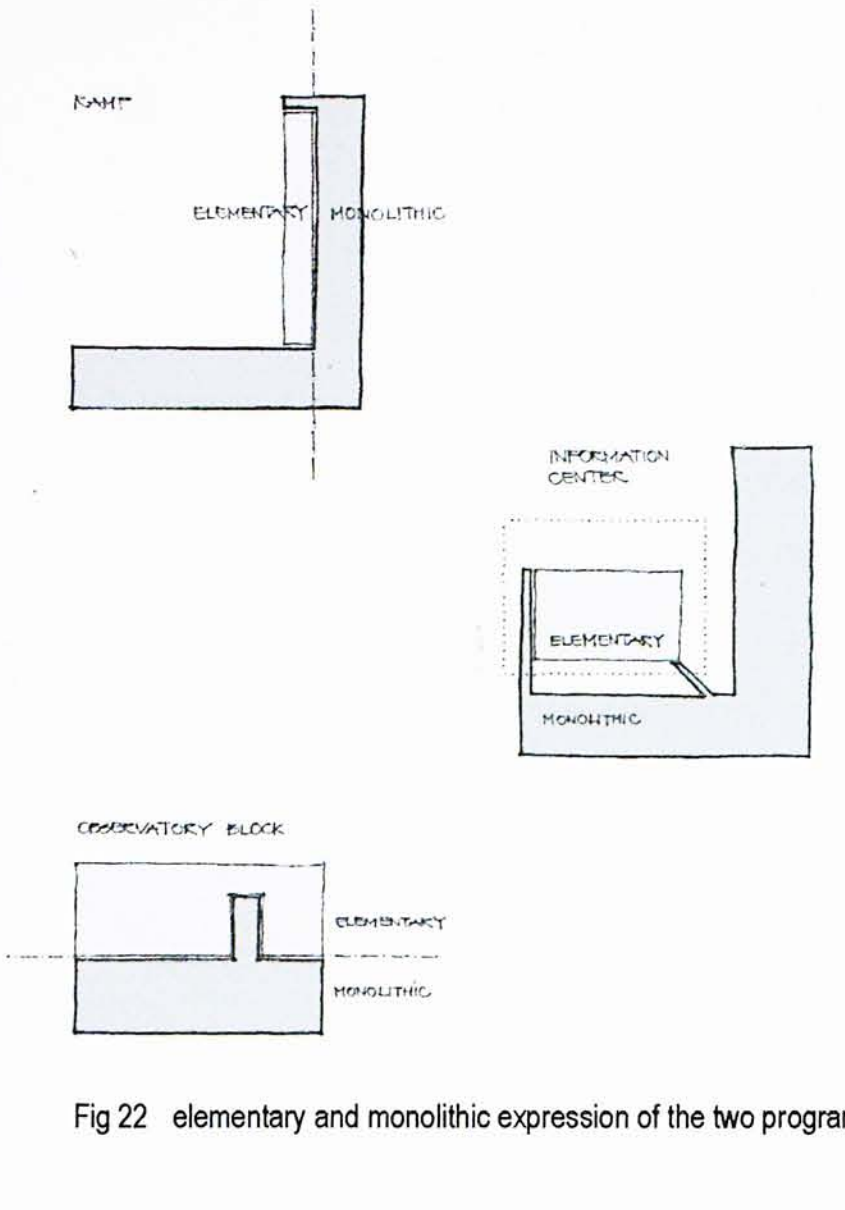


Fig 22 elementary and monolithic expression of the two programs

8.2 Architectural expression of the two programs

The intention of this process is to distinguish the two programs by different expressions. The academy is constructed with in-situ concrete while the public interface is defined by elementary elements such as pre-cast panels, slabs and roof fabricated with metal. (Fig 22) By doing this the whole building can be constructed with the same material, i.e. concrete, while the two programs can be distinguished by the different treatments of the same material.

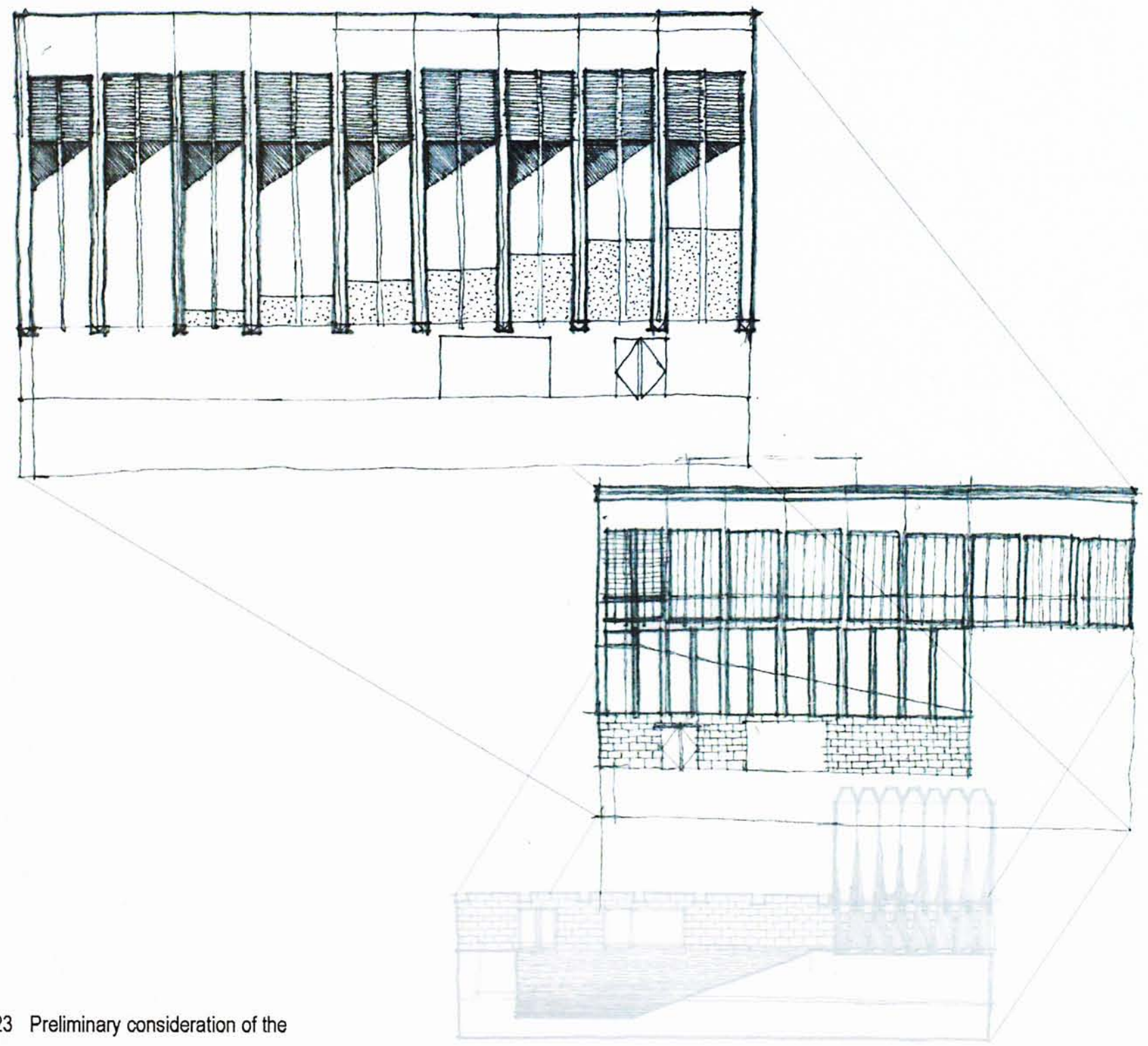


Fig 23 Preliminary consideration of the western elevation and the cross-section

8.3 Form and façade treatment

The whole building consists of different masses which define different outdoor areas for various activities. The main building is a linear mass suggesting an axis linking the land and the harbour. Adjacent to the main building is the wave pool which is submerged into the ground with 1 storey high building mass above the ground. The wave pool is a horizontal planar element in the composition. The information centre is a cluster of hovering planes over the wave pool and is connected with the main building by a small bridge. The element connecting the main building and the building mass at the harbour is a straight concrete bridge which directly spans over the protected water. The foundation for the building mass at the harbour are walls perpendicular to the coast, above it is the platform for the pier. The building mass in the harbour is a 3 storey high linear building with a void at below for the passage of the pier users, while at the roof is the outdoor dinning area with a cantilevered metal roof at above.

In order to maintain the consistency of the whole design, the facades of the various masses are treated with the same vocabulary with variations. The exteriors of the buildings are covered with concrete panels and the roofs are cantilevered planes fabricated with metal. Axonometrics are used as tool for designing the facades. (Fig 24-32)

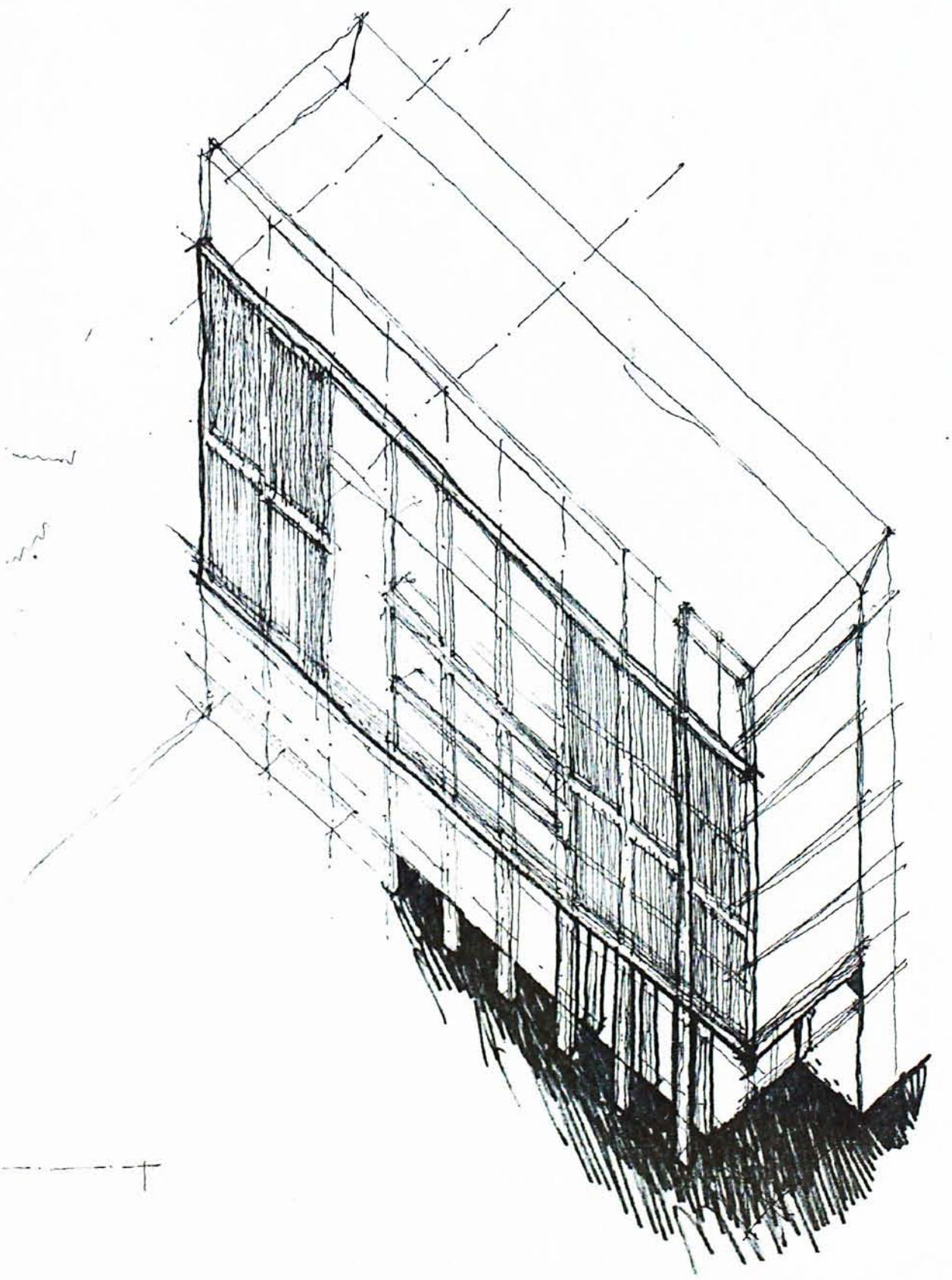


Fig 24 panels on the facade

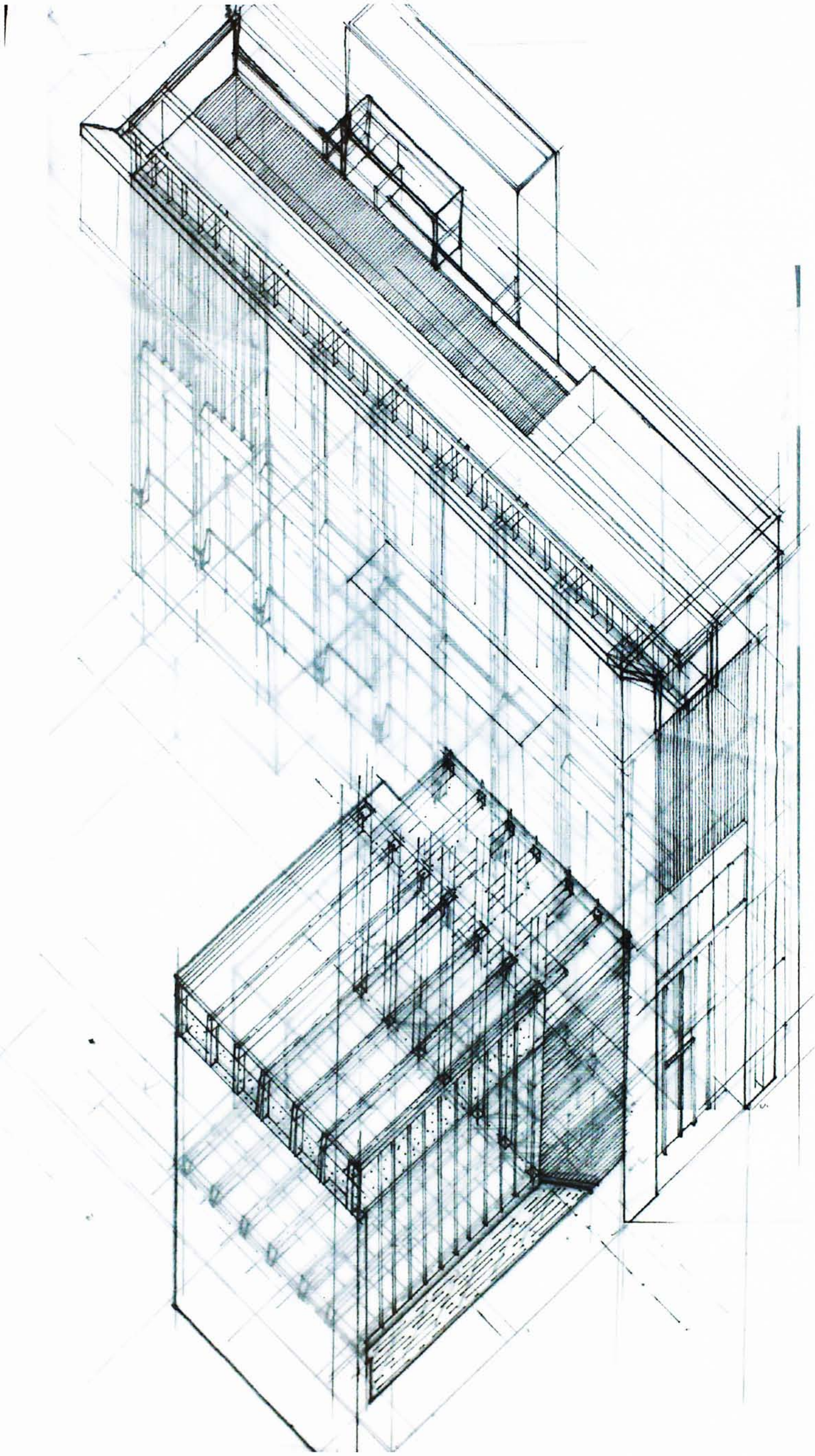


Fig 25 elementary design of the information centre
and the western facade

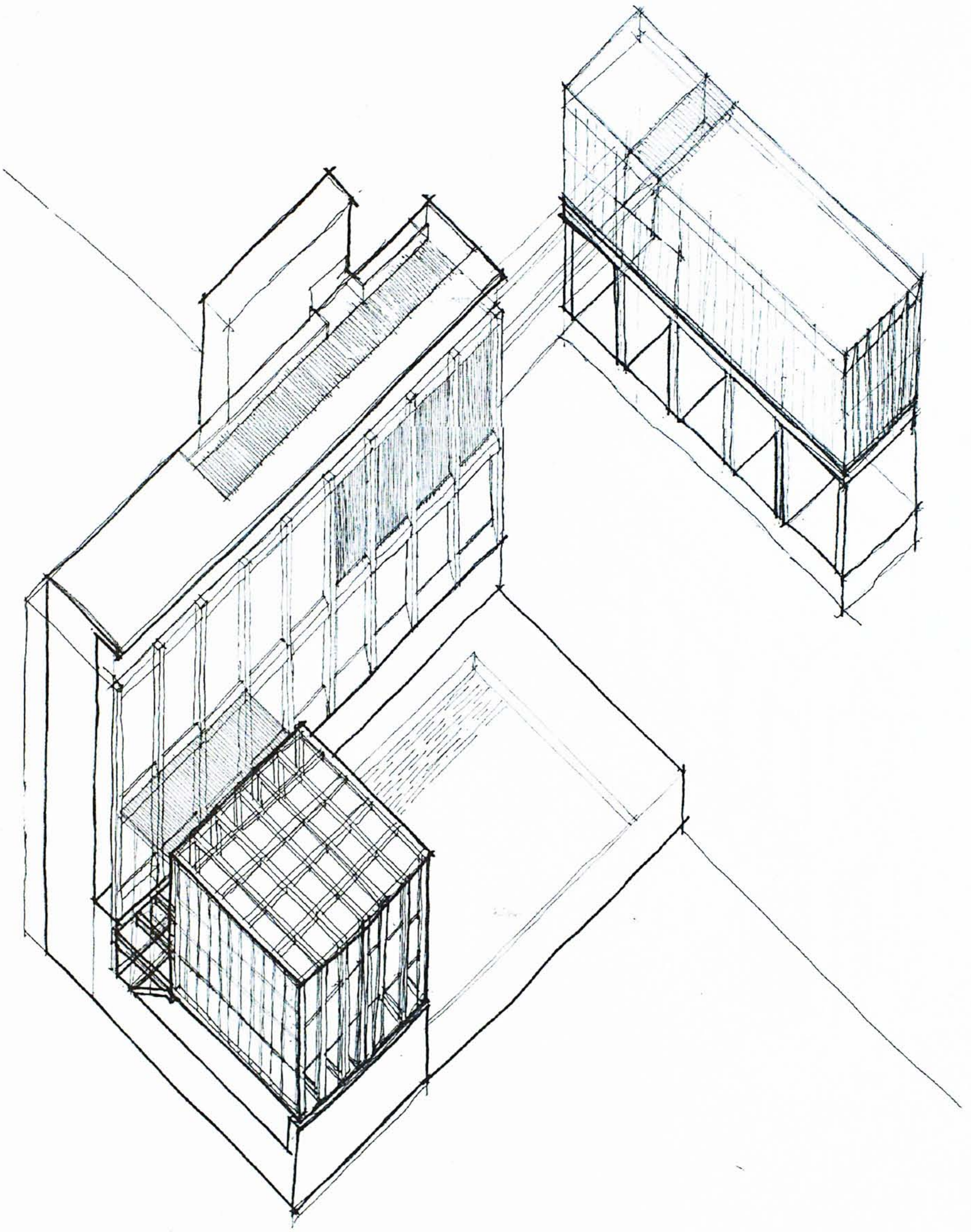


Fig 26 combination of masses and façade treatment

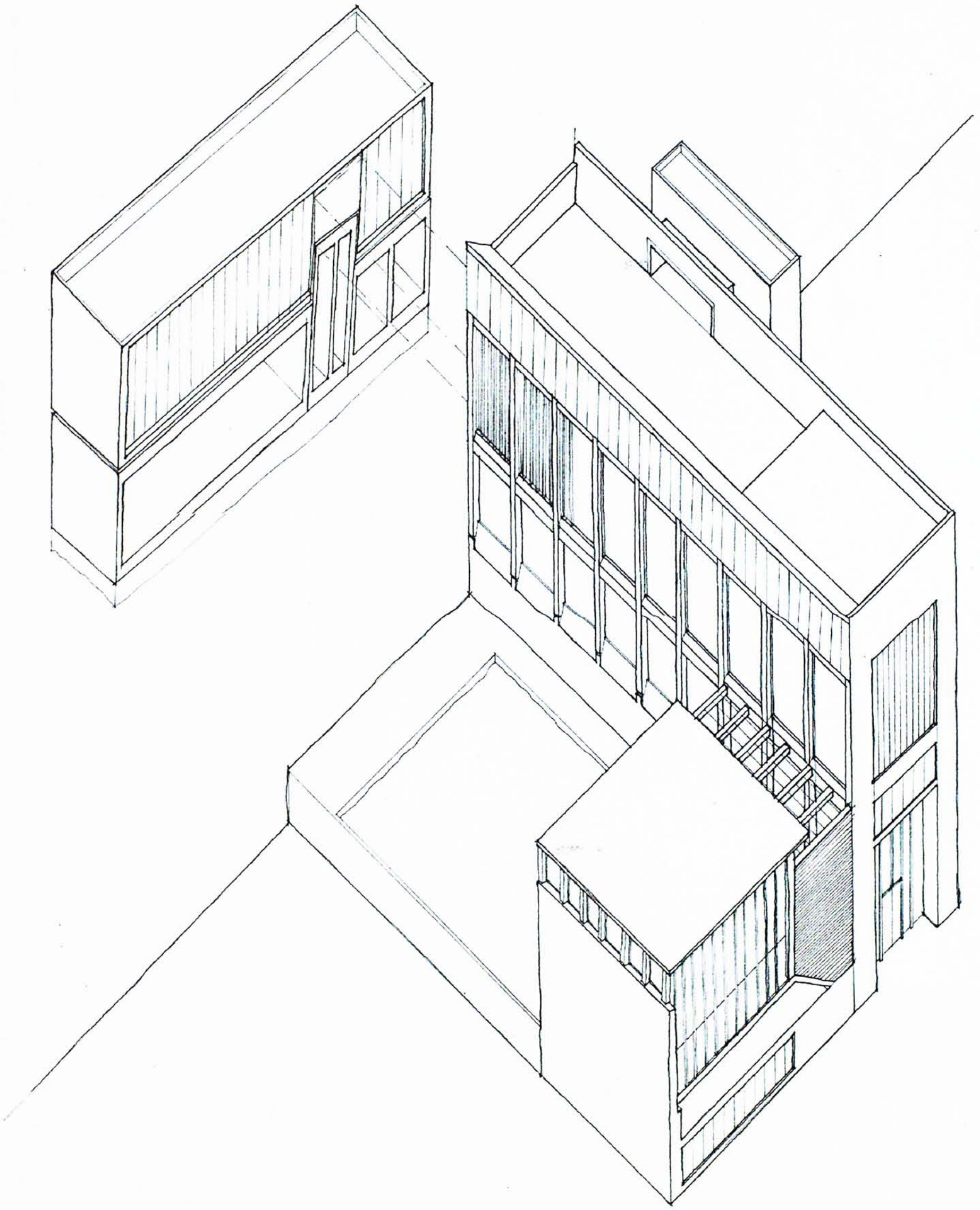


Fig 27 façade design, revision 1

Fig 28 façade development, revision 2

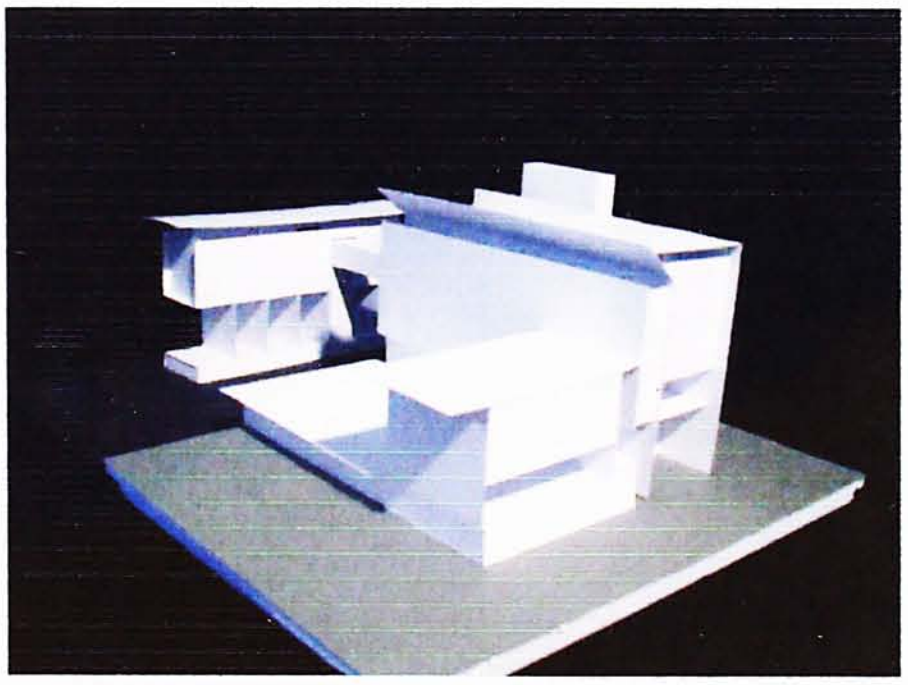


Fig 29 working model with planar expression, SW axonometric

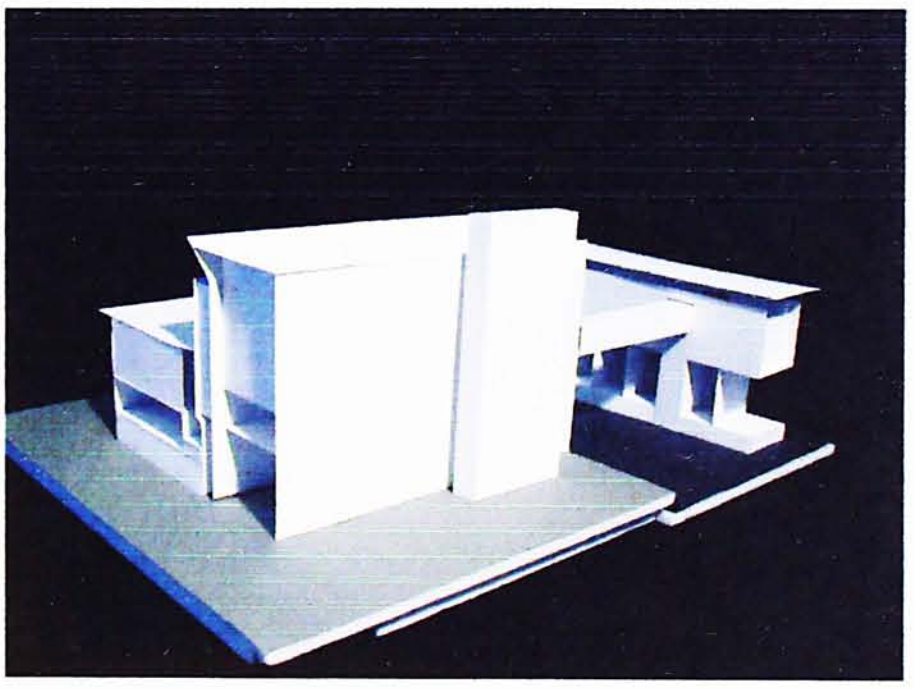


Fig 30 working model, SE axonometric

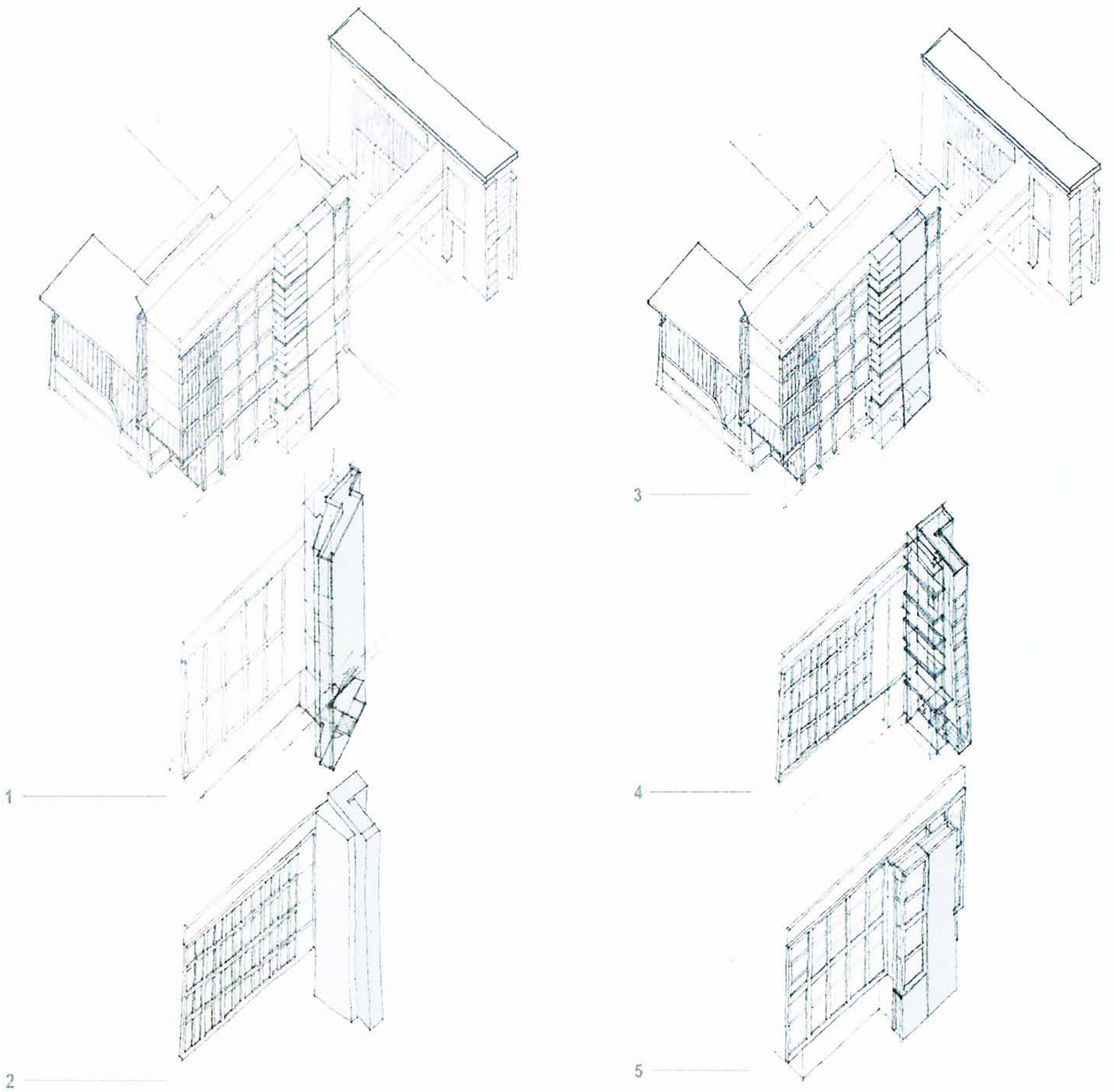


Fig 31 treatment of the service core

1. the core is tilted horizontally to create a more welcoming gesture
2. core with configuration perpendicular to the main building
3. the frontal part of the core is covered with glass so that the stair can be seem. The rear part of the core is covered with concrete panels
4. similar to option 2, with the lobby placed at the front
5. similar to option 3, with the rear part solid and the frontal part covered with concrete panel and of glass openings. This option was used in the final presentation

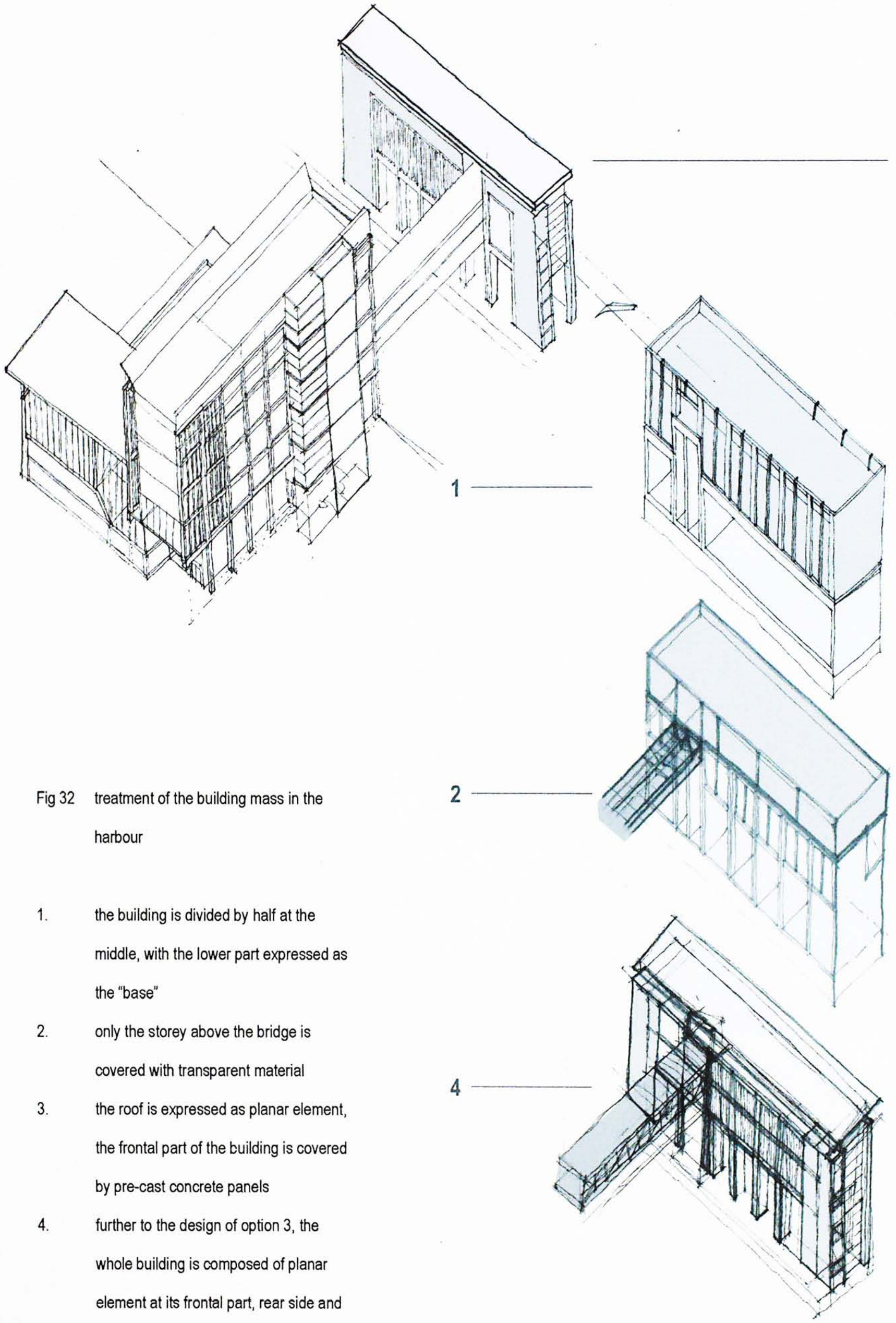


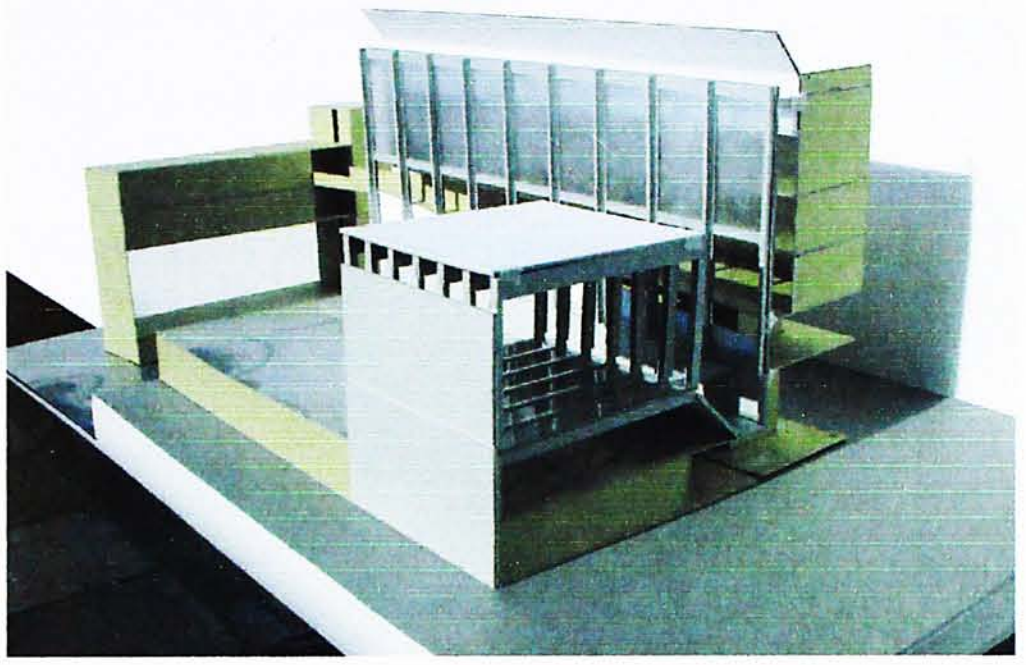
Fig 32 treatment of the building mass in the harbour

1. the building is divided by half at the middle, with the lower part expressed as the "base"
2. only the storey above the bridge is covered with transparent material
3. the roof is expressed as planar element, the frontal part of the building is covered by pre-cast concrete panels
4. further to the design of option 3, the whole building is composed of planar element at its frontal part, rear side and the roof

1

2

3



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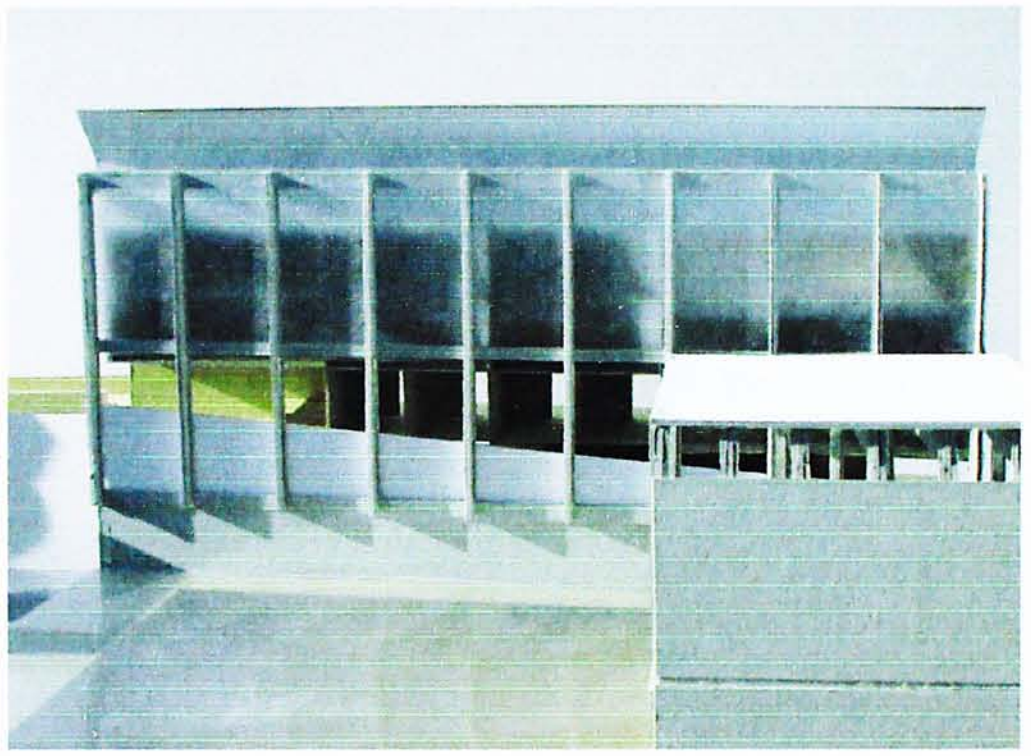

5

Fig 33 working model showing the pre-cast concrete panels at the western elevation

1. the information centre
2. reflection of the wave pool
3. upper portion of the ramp
4. SW view of the model
5. western elevation showing the pre-cast panels

8.4 Special study – the use of pre-cast panels[5]

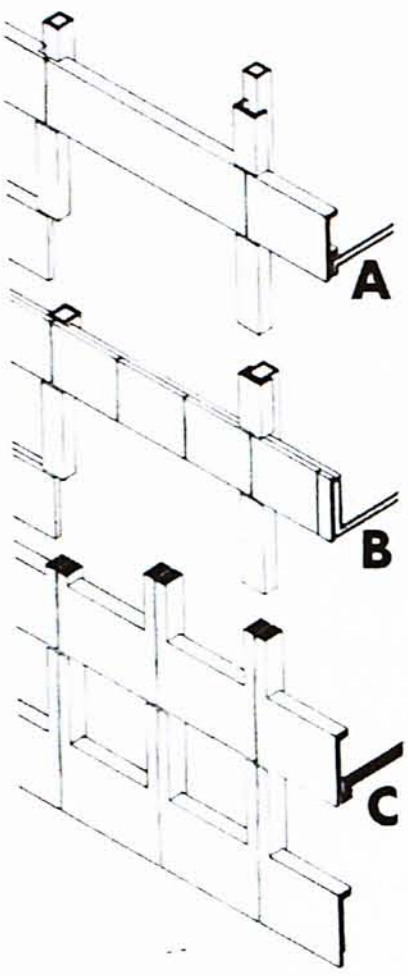

Fig 34 the three basic ways of using pre-cast concrete in architecture: (A) cladding fixing to a structural frame; (B) permanent formwork to insitu concrete structural members; and (C) loadbearing primary structural components

Planar elements are largely used in the design and thus became one of the characteristics of the design. The façade of the building is clad with pre-cast concrete panels with different dimensions and different types of glass are used for penetration of sunlight. The properties and characteristics of pre-cast concrete panels are thus under investigation.

Using pre-cast concrete in architecture were first introduced during the nineteenth and early twentieth century development of the material. The three basic methods of using pre-cast concrete, separately described in historical sequence, are:

i) cladding fixing to a structural frame

ii) permanent form-work

iii)load-bearing structural components (Fig. 34)

In the design of the Maritime Safety Academy, only the method "cladding fixing to a structural frame" is used, therefore only this method will be discussed below.

Fixing

In order to ensure that the pre-cast components are fixed in place, it must be ensure that the dead load of the components and the applied forces on the component, which usually resulting from wind pressure, are transferred to the structural frame. Based on this principle, two basic types of details have been developed:

i) fixings with a primary load-bearing function but which also provide restraint against applied forces

ii) fixings with only a restraint function.

As the concrete panel covers several floors and is heavy in weight, therefore the fixings used only serve for restraint function rather than load-bearing function. The loading of the components will be transferred through the direct contact of the components with the structural frame.

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5. Extract, from 179-310, *Precast Concrete in Architecture* by A. E. J. Morris, The Whitney Library of Design, 1978.

Materials for fixings

	Metals	1	2	3	4	5	6	7	8
1	Copper				▨	■	▨	■	■
2	Phosphor bronze				▨	■	▨	■	■
3	Aluminium bronze				▨	■	▨	■	■
4	Stainless steel	▨	▨	▨		■	▨	■	■
5	Mild steel	■	■	■	■		■	■	
6	Manganese bronze	▨	▨	▨	▨	■		■	■
7	Aluminium	■	■	■	■	■	■		■
8	Cast iron	■	■	■	■		■	■	

Fig 35 matrix identifying undesirable bi-metallic combinations (from Fixing for Building, published by Harris and Edgar Ltd.)

The blank box represent these metals can be used together in all conditions, the hatched box means these metals can be used together in dry conditions only; and the black box means these metals must not be used together.

The metals used for the fixing of components must be corrosion resistant and of adequate long-term strength; fixings are usually covered over and can neither be inspected nor replaced. Corrosion can result from three causes operating separately or in combination, which includes oxidation, galvanic or bi-metallic contact and material disintegration of some alloys. Resistance to progressive oxidation is ensured by specifying a suitable stainless steel or non-ferrous metal. Galvanic corrosion is likely to occur if certain dissimilar metals are in contact in the presence of moisture. Fig 35 shows possible and undesirable bi-metallic combinations and these situations should be avoided.

Principles of cladding fixing

The deadweight of the cladding panel should be supported on only one bearing level, usually at or near the bottom or top. However, support at an intermediate level is possible. Direct bearing onto a horizontal structural frame member is recommended and the fixings should be symmetrically arranged around the edge of the panel; restraint fixings to be located at the corners.

The panels used in the design sit onto the projected beam, which fulfill the requirement described above.

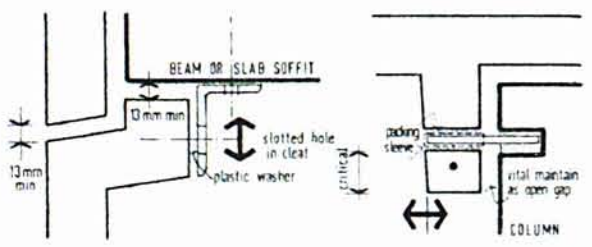


Fig 36 Provision for lateral movement of cladding panels relative to the structural frame in the design of restraint fixings: left, through slotted cleat holes for panel bolts, permitting differential vertical movement; and right, with loose sleeves over dowels prior to grouting into panel holes

Restraint fixings usually involve the use of either the basic bolted angle cleat, or grouted dowel rod details. With the former method provision for lateral movement of the panel, relative to the structural frame involves directionally slotted cleat holes for the panel bolts and their appropriately controlled partial tightening. Differential movement with the dowel rod method is usually facilitated through a loose sleeve fitted over the dowel, prior to grouting into the panel hole. (Fig. 36)

Joint functions and design

A comprehensive list of joint function is given in the Building Research Establishment's Digest 137, Principles of Joint Design, including most importantly:

i) Control of environment-passage of water, air, sound, insects and vermin, plant leaves, roots, seeds and pollen
ii) Load-bearing capacity
iii) safety
iv) Maintenance – to permit partial or complete dismantling and reassemble
v) Fixing of components
vi) Accommodation of deviations – variations in sizes of the joint at assembly, and during subsequent performance on the building
vii) Durability – to have specified minimum life: to resist damage by extremes of temperature, polluted air, light, air-borne or structure-borne vibrations, plants and micro-organisms
viii) Ambient conditions – to perform required functions over specified ranges of joint clearance variations, air-pressure differentials, atmospheric humidity, and temperatures
ix) Appearance – to have initial and subsequent acceptable appearance
x) Economics – to have economic first cost, maintenance cost, and to have economic depreciation

Abstracted from this selected summary of criteria for joint design, the following factors will generally determine the design of joints in practice.

Control of environment: this will usually entail the provision of a weather proof seal to exclude water, dust and air under normally encountered wind-pressure conditions.

Accommodation of deviations: the width of joints in practice will usually be determined by the effect of induced and inherent deviations, related to the performance characteristics of the various

joint-sealing methods. It is vital also that the minimum width of the joint is adequate to facilitate maneuvering components into position, in particular the last components in a closed run.

Durability and economics: these are related considerations and careful specification is required to ensure optimum cost-benefit from products whose life expectancy is less than that of the overall building fabric.

The appearance of joints: the appearance of the joints will affect the elevation of the building and thus of major importance to the architectural design.

Joint weatherproofing

There are four basic methods for weatherproofing movement joints between pre-cast concrete components:

i) External-sealed joints

ii) Open-drained joints

iii) Gasket-sealed joints

iv) Mechanically-sealed joints

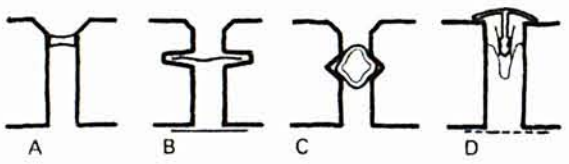


Fig 37

Diagrammatic illustration of the four basic types of joint weatherproofing methods: (A) external-sealed joints; (B) open-drained joints; (C) gasket-sealed joints; and (D) mechanically sealed joints.

The four methods are shown diagrammatically in Fig.37. The external-sealed joint is the most versatile and widely method for joints between pairs of pre-cast components, but both open-drained and gasket-sealed techniques have gained in popularity over recent years. Mechanically sealed joins are usually purpose designed for use in extra-special movement conditions. Elevation design considerations and related economic implications will usually determine which of the four methods is best suited for individual building requirements. External-sealed and gasket-sealed methods are best-suited, in that order, for joints between pre-cast components and bounding structural frame members, or adjoining dissimilar material components.

The above theory can be applied to the design of the concrete panels in the Academy. The panels can be pre-fabricated from the

factories in the Mainland China, most preferably through metal form-work as the surface finishing of the panels would be finer in quality. There are mainly two types of modules for the panels, one of 4m and the others of 3m. The variations of the panels can be achieved through using different components of the form-work. Also, different types of glasses would be fixed to the panels to create different lighting conditions.

The fixings of the panels to the structural frame can be of restraint function with the panels sitting onto the beam of the structural frame. Either external-sealed or gasket-sealed joints can be used, subjected to the real situation.

8.5 Details and constructional consideration

In order to investigate how various elements can be joint together, a detail section of the south-west corner is drawn. The drawing shows how the pre-cast panels, slabs and metal roofs of the information center are connected to the main building. It also shows how the various architectural components compose space within.

The foundation of the building mass in the harbour is composed of piles with vertical walls at above. The reason for choosing such configuration is because this design can minimize the impact of wave from the harbour as it allows sea water flowing through it in the south-north direction. Meanwhile, concrete can resist erosion from the seawater and thus increase the durability of the structure.

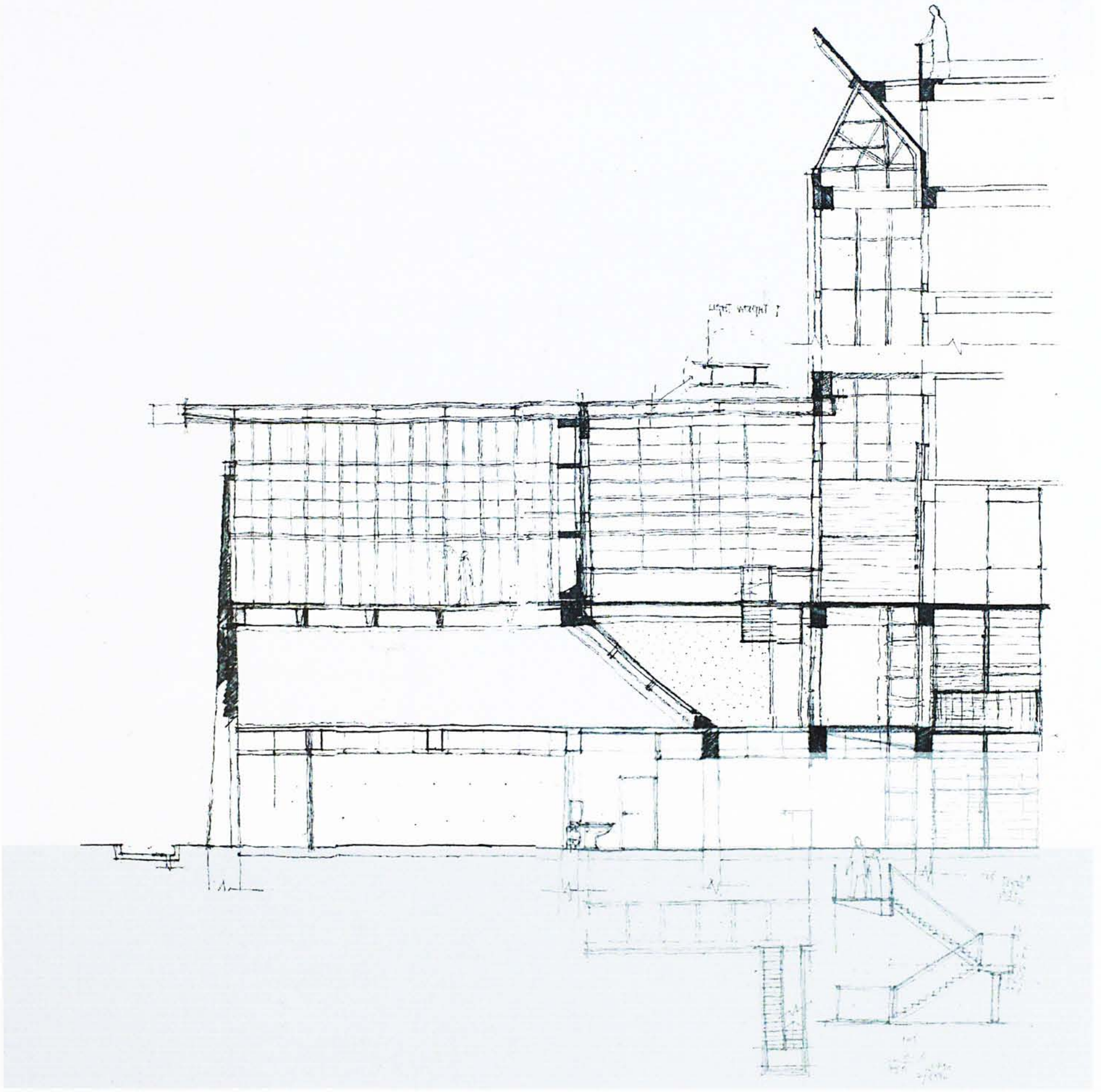


Fig 38 draft of the detail section

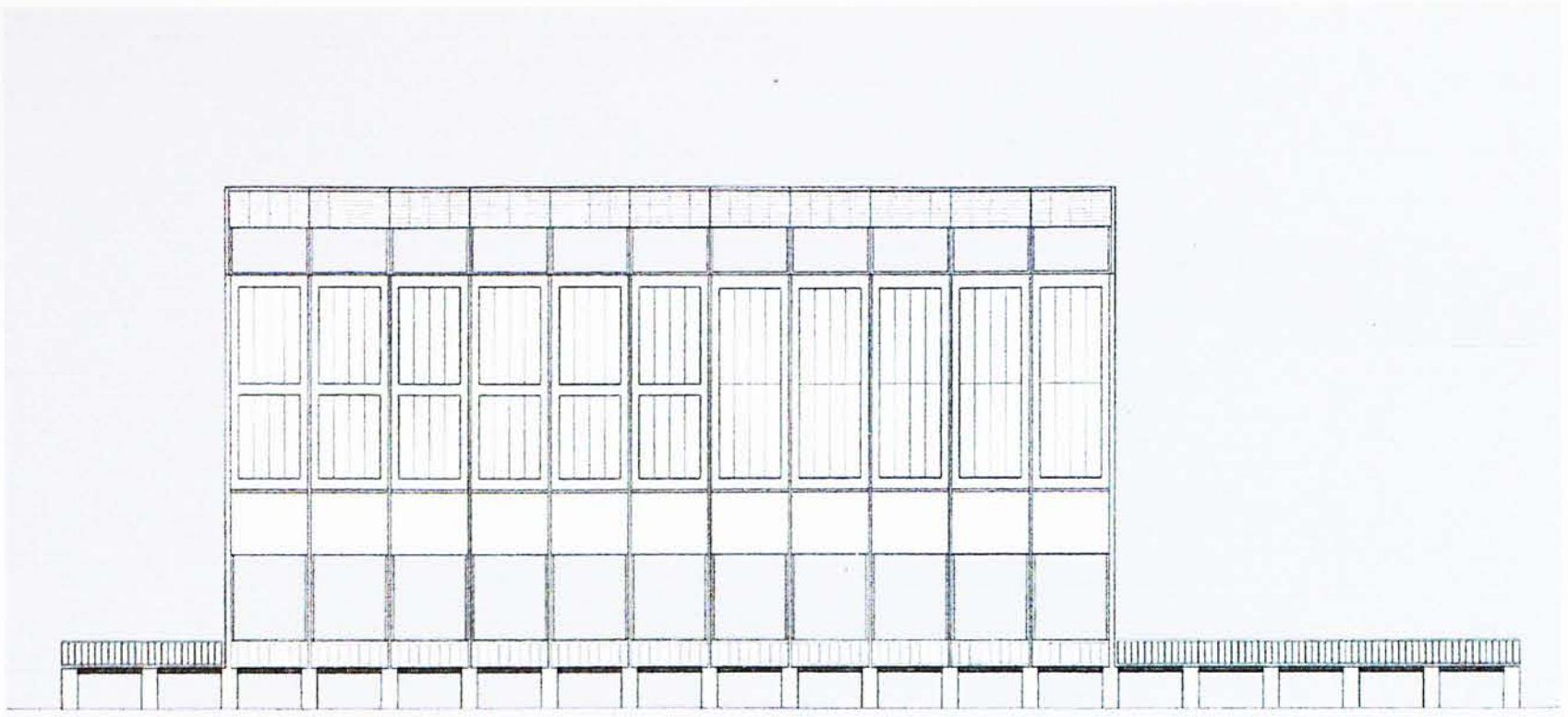


Fig 39 south elevation of the building mass in the habour

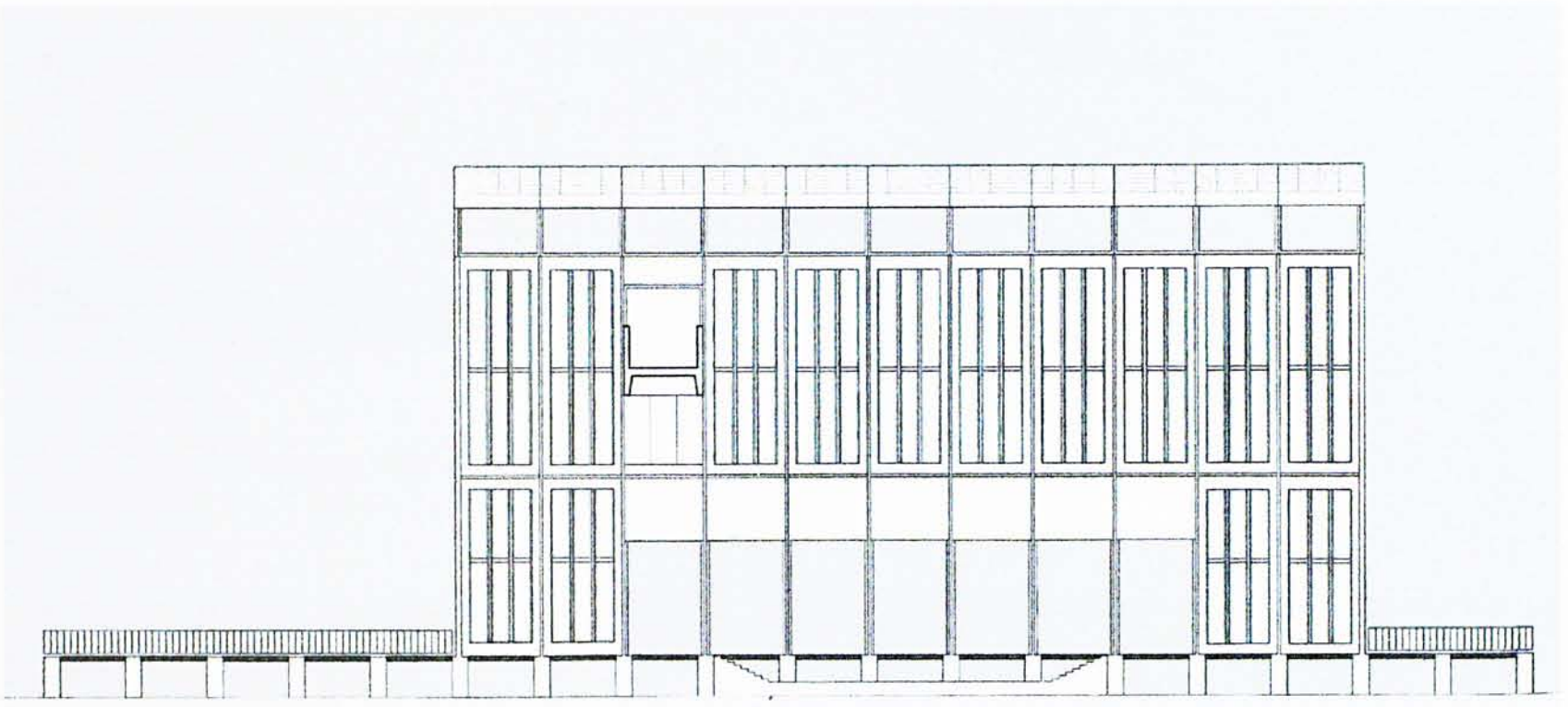


Fig 40 north elevation of the building mass in the habour

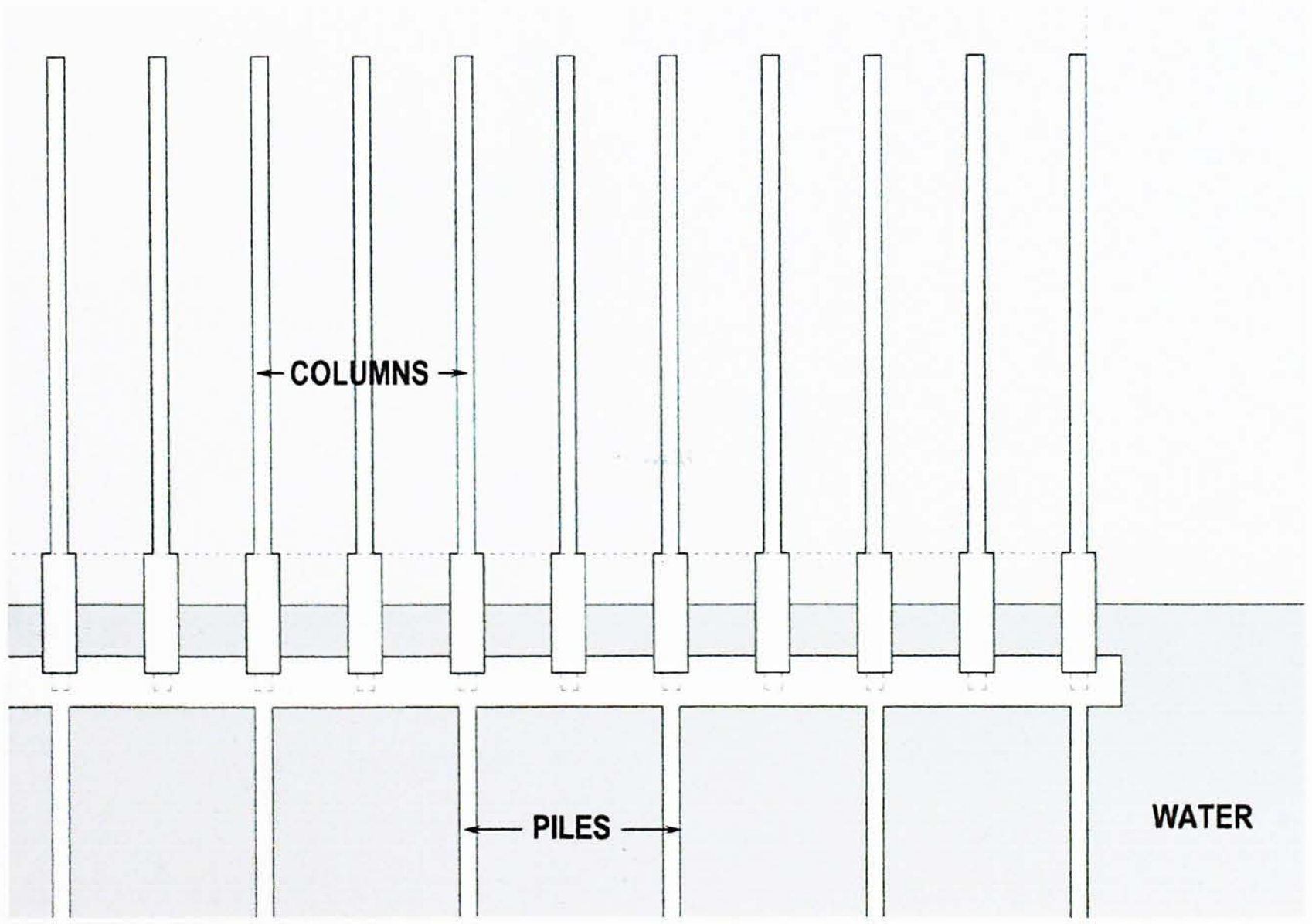


Fig 41 foundation of the building mass in the harbour

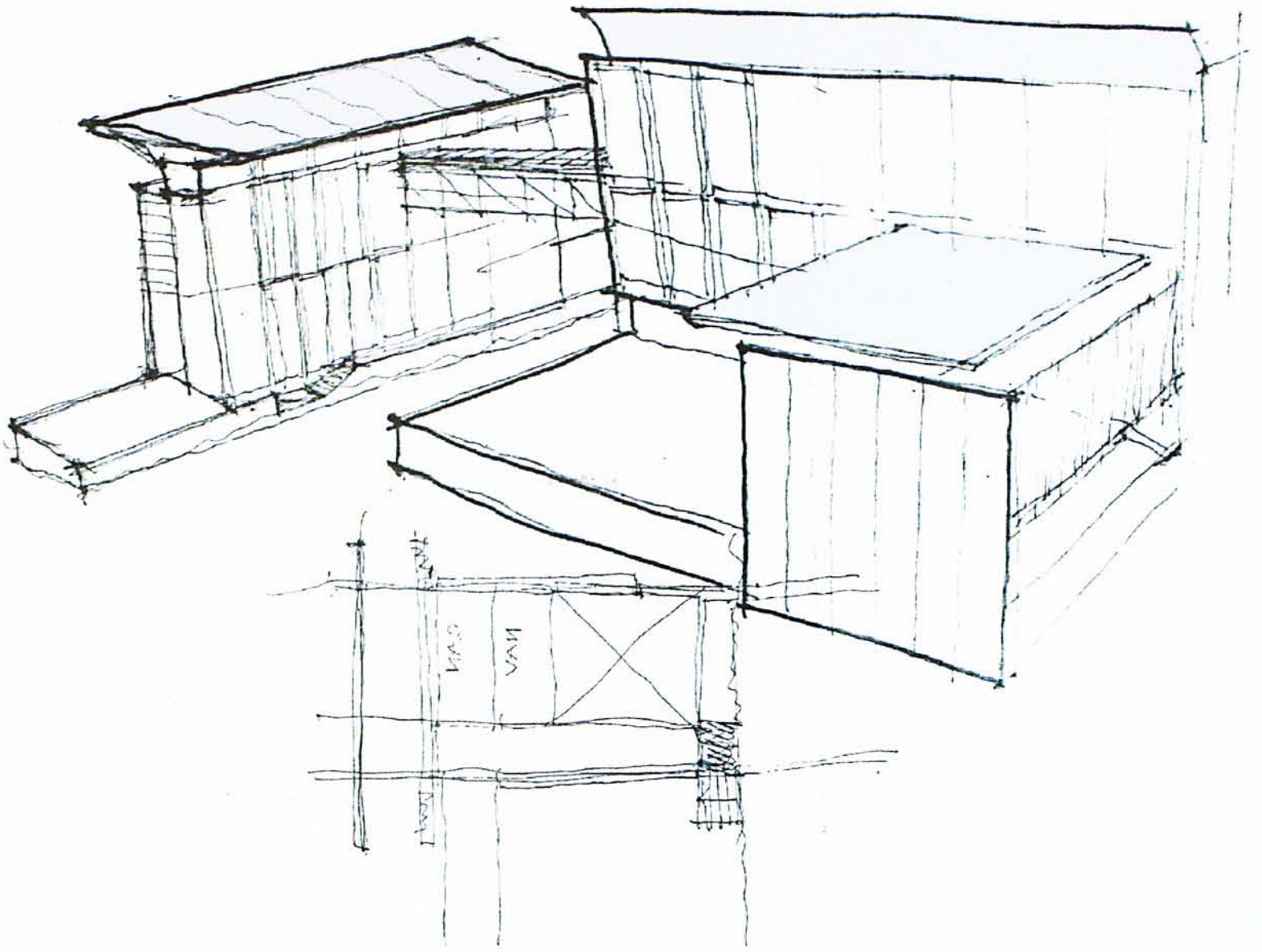


Fig 42 sketches of the roof form

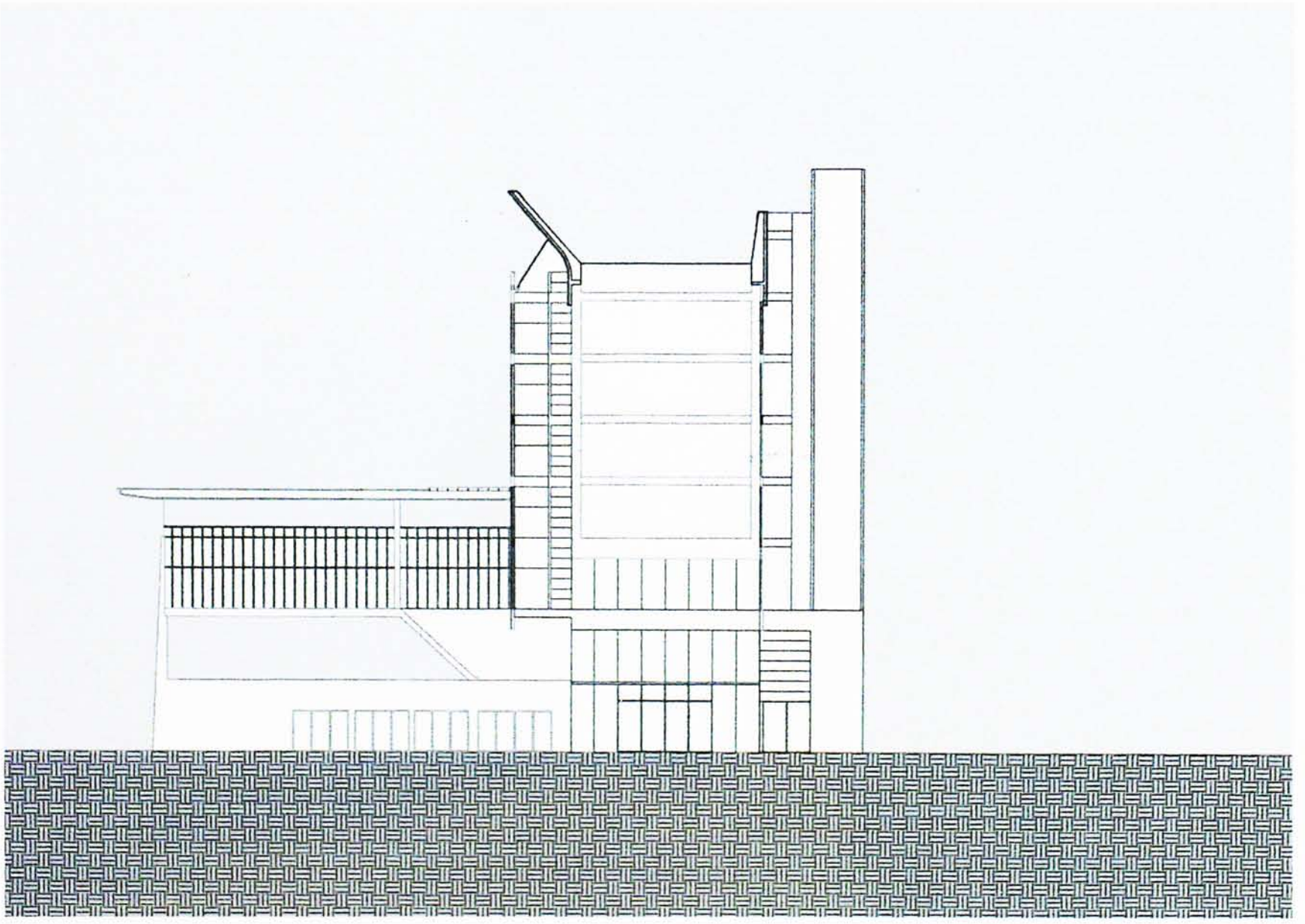


Fig 43 draft of the south elevation

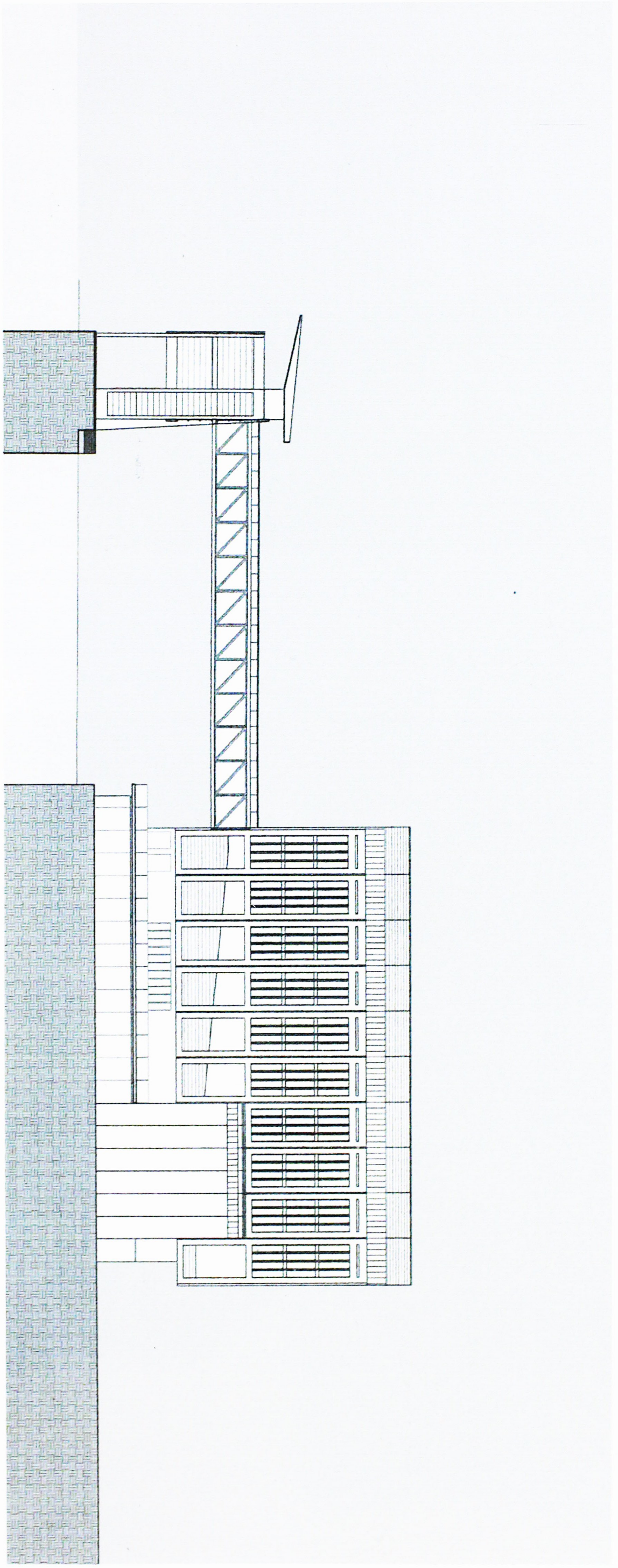


Fig 44 draft of the west elevation

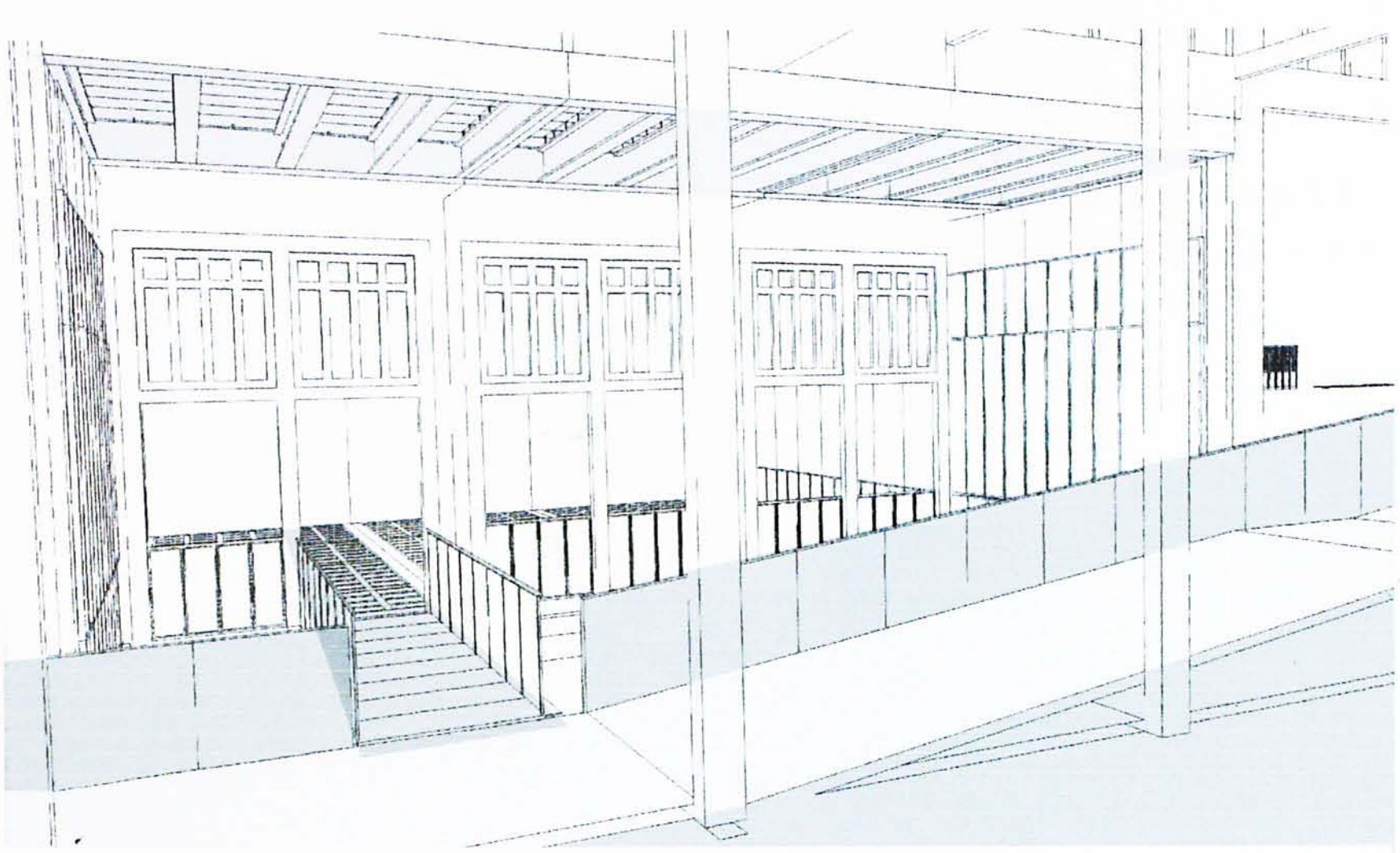


Fig 45 interior perspective, bridge leading to the information centre

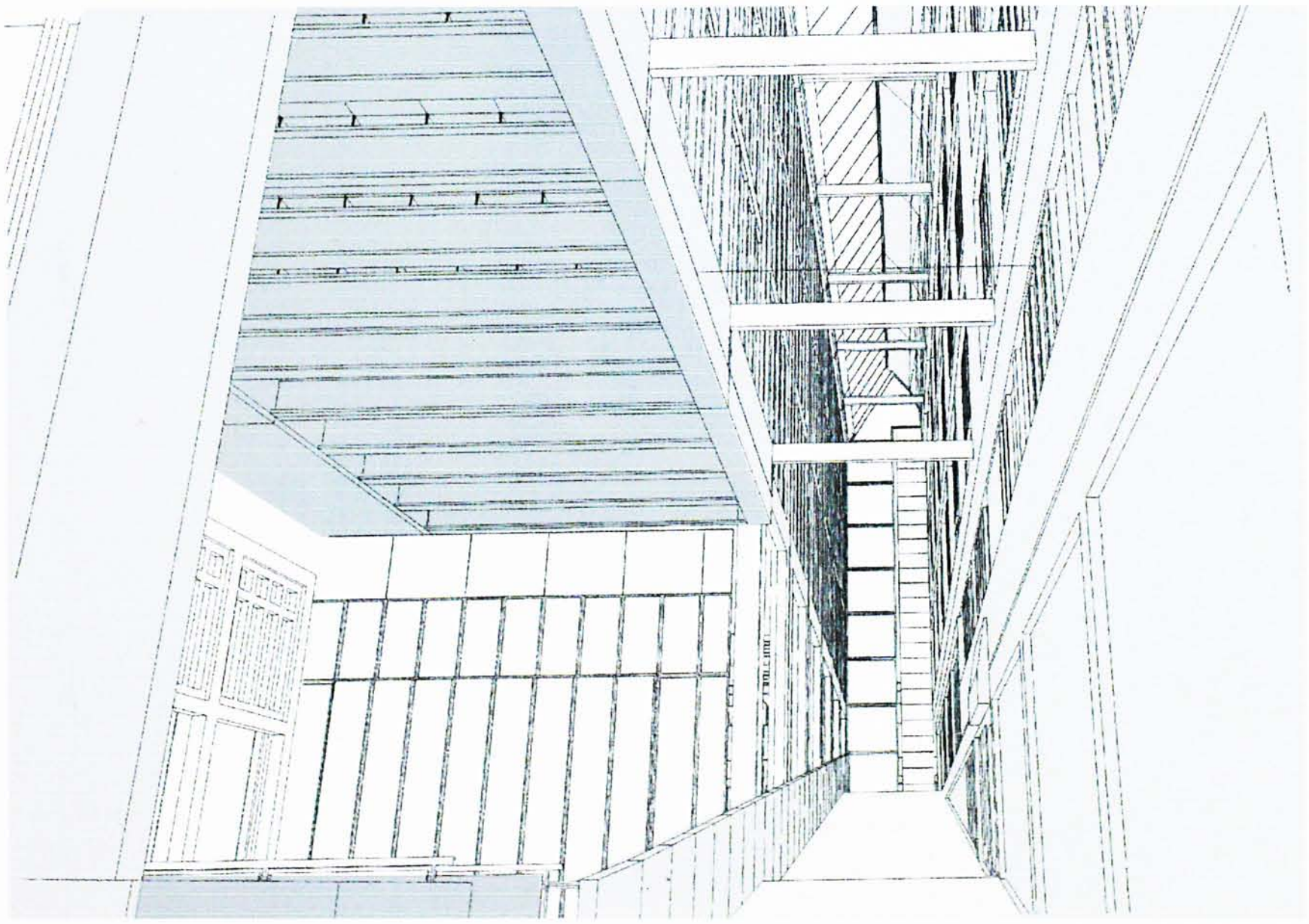


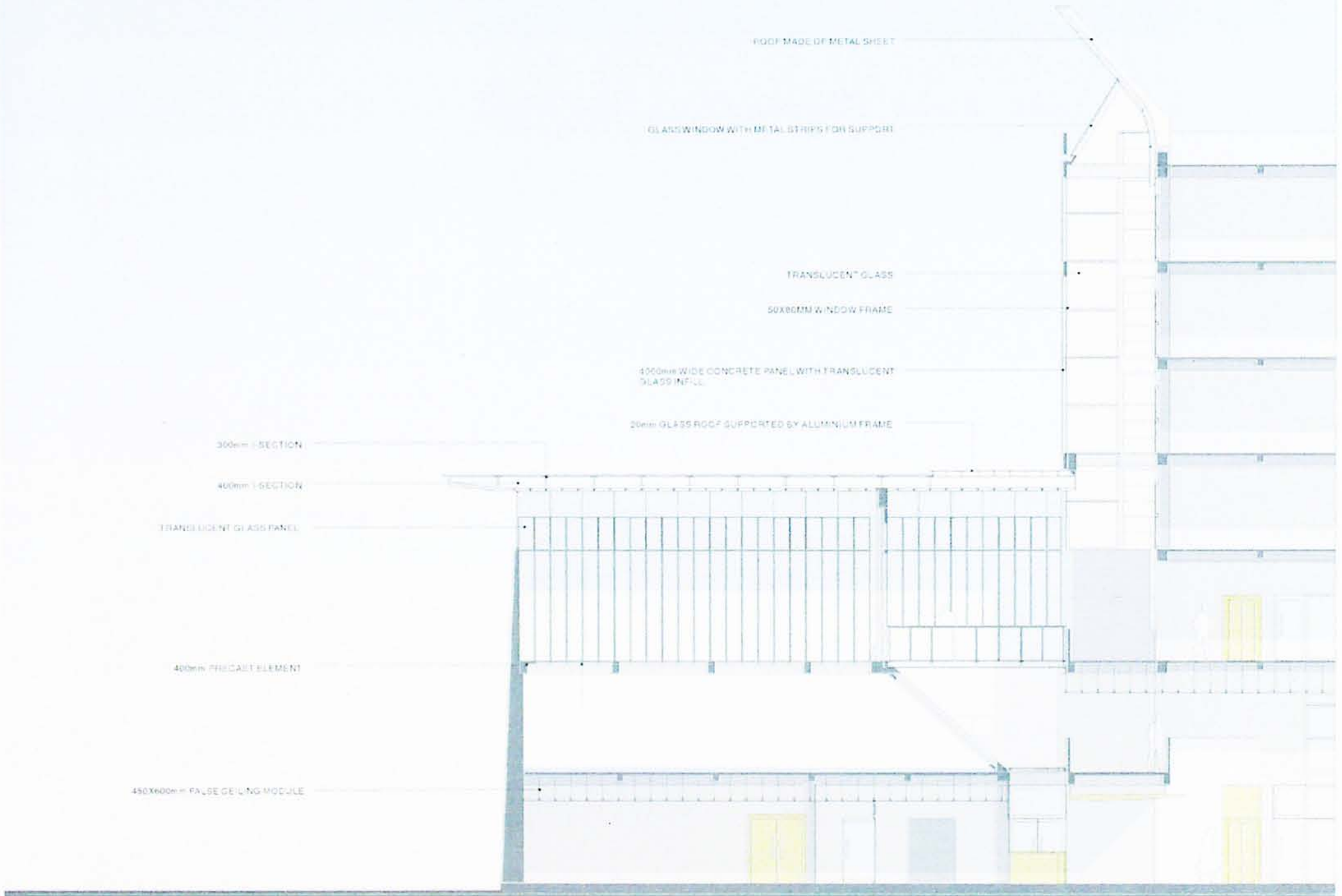
Fig 46 interior perspective, lower level of the ramp

9. Final Presentation Documentation

There are two main emphasis of the final presentation. The first one is the relationship of the two programs. It is presented by a serious of interior perspectives and plans. The perspectives are arranged in a sequence that it is just similar to a walk-through of the building. The other emphasis is the composition of the building. Exploded axonometric is used to show how different planar elements are used to compose the whole building and the relationship of elements is shown in the detail section.

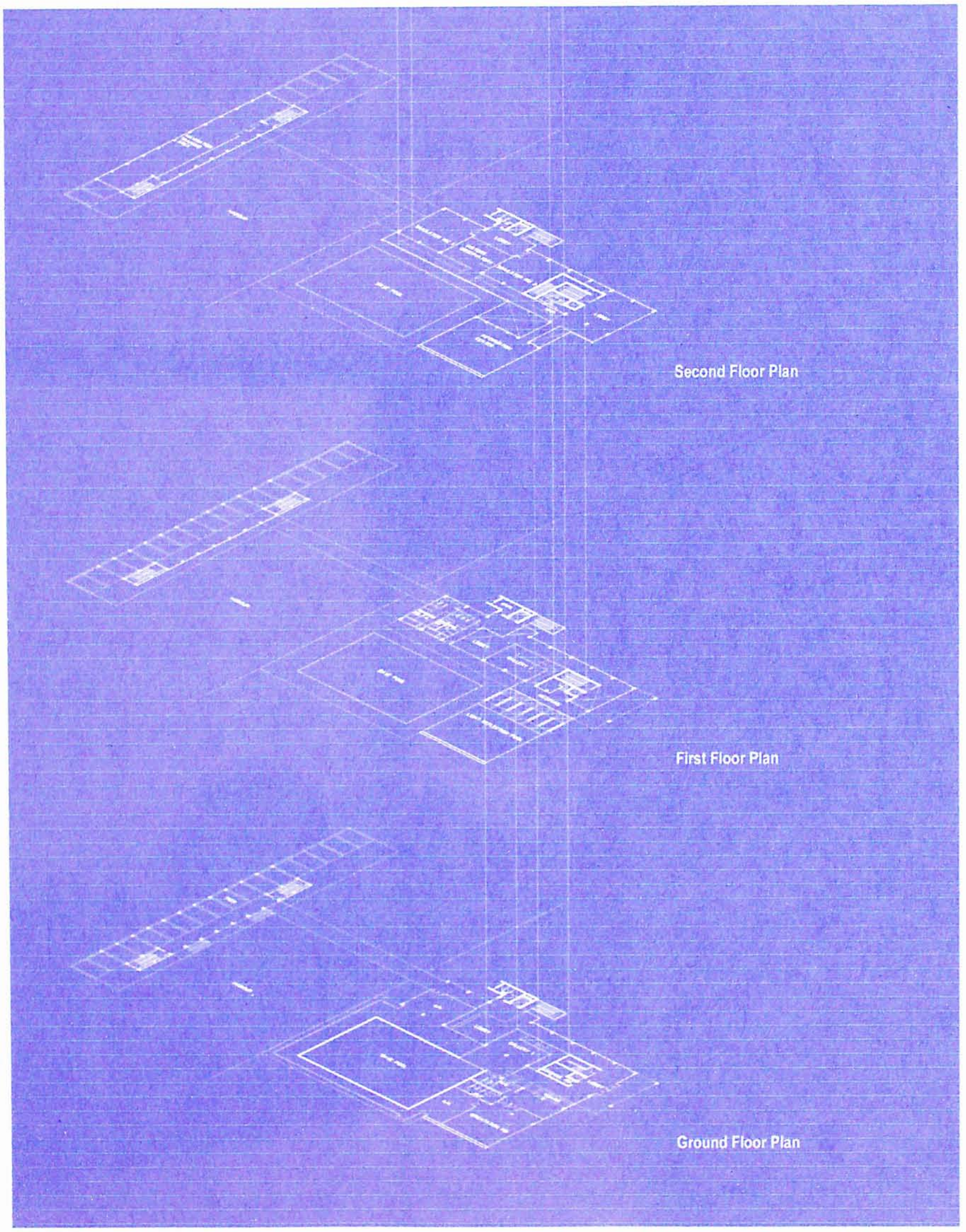
MARITIME SAFETY ACADEMY AND ITS PUBLIC INTERFACE
海事訓練學校及其公共界面

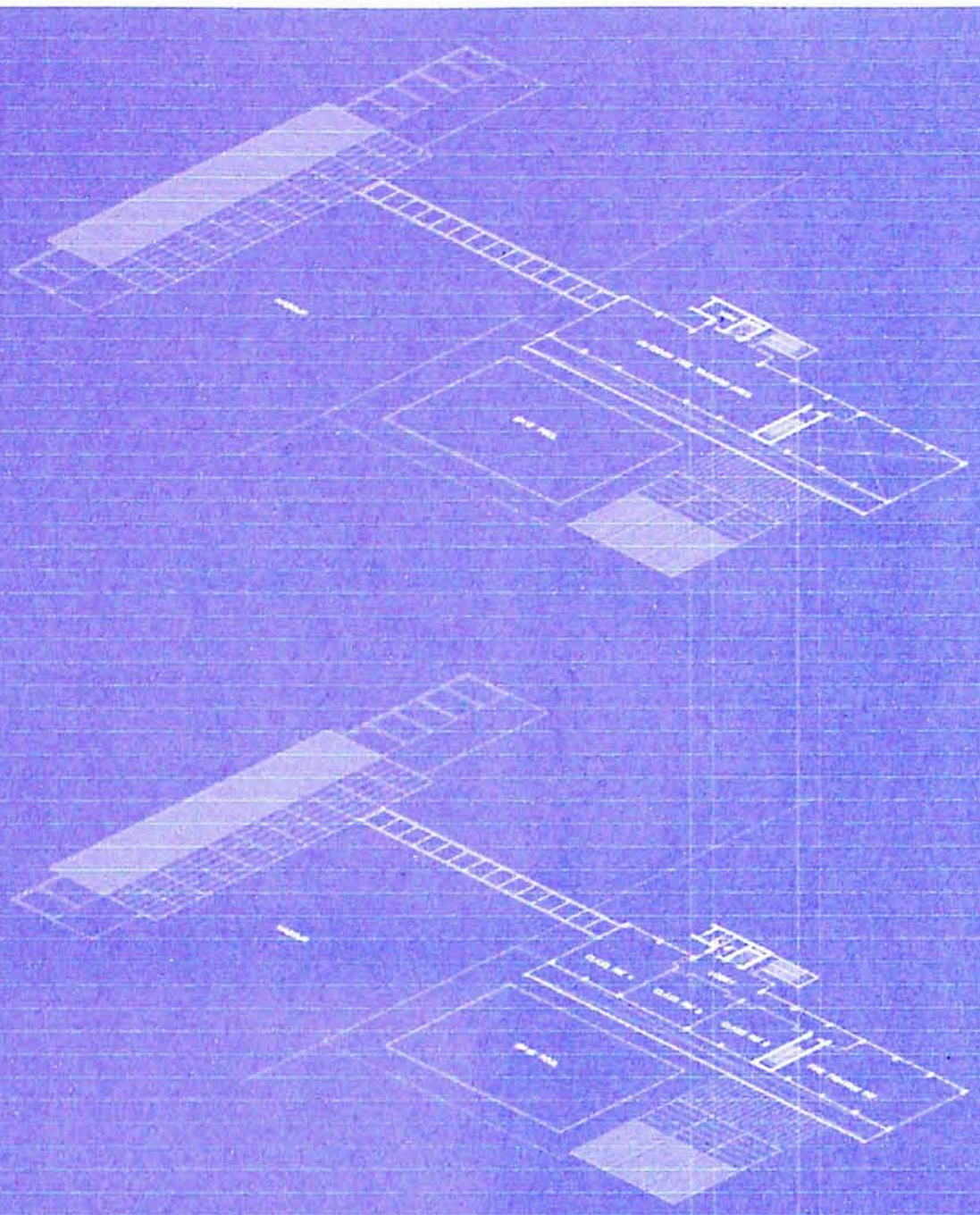
STUDENT: LAM KAM FAI, JEFFREY



SECTION 1:50

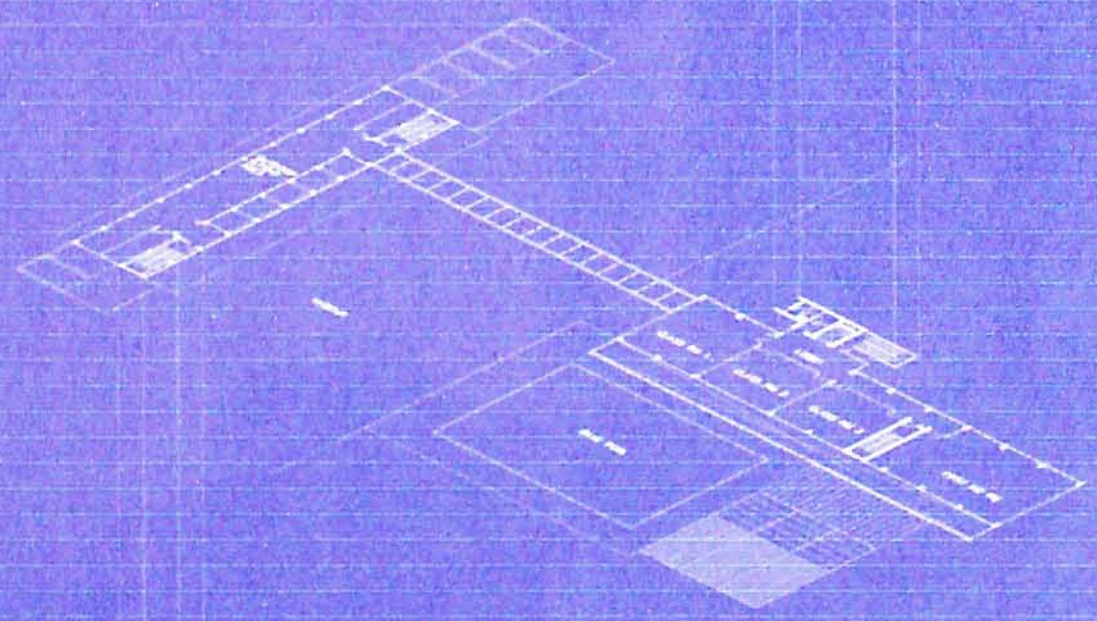
Plans, Ground Floor to Sixth Floor



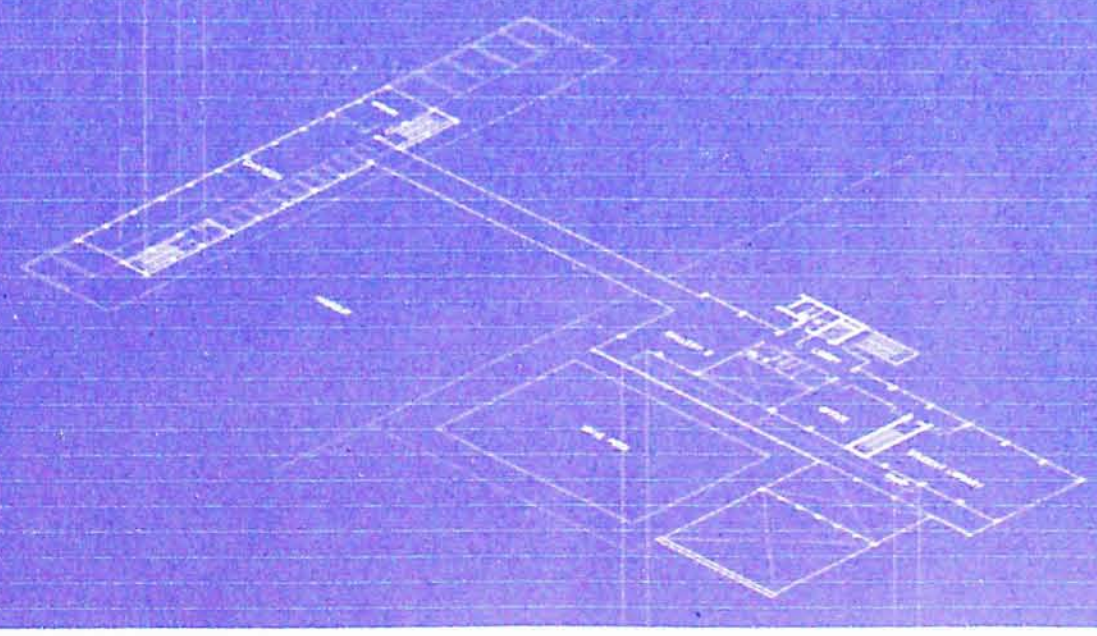


Sixth Floor Plan

Fifth Floor Plan

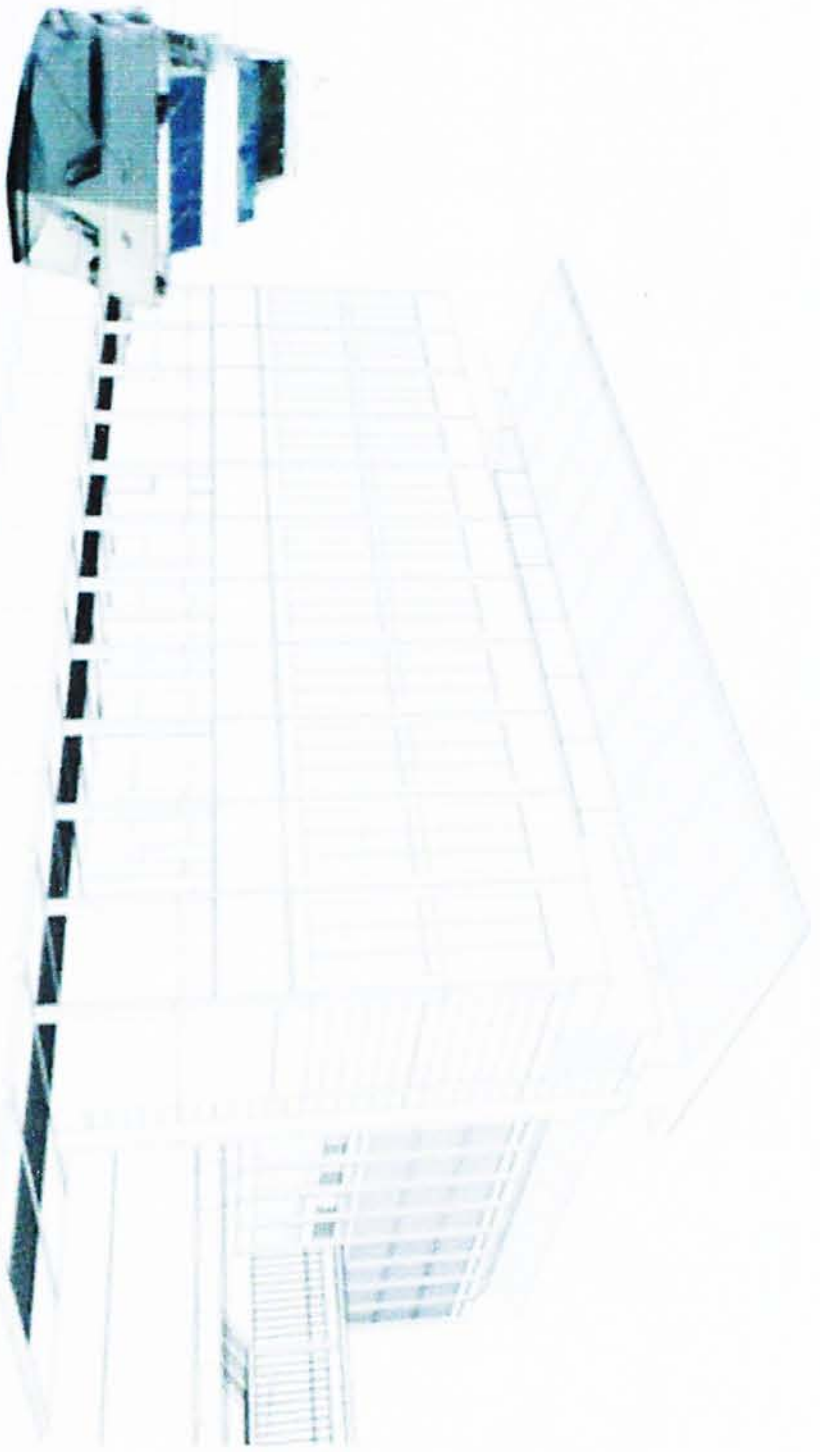


Fourth Floor Plan



Third Floor Plan

Looking at the radar room from the cafeteria



View from vessel at the pier

Upper level of the ramp

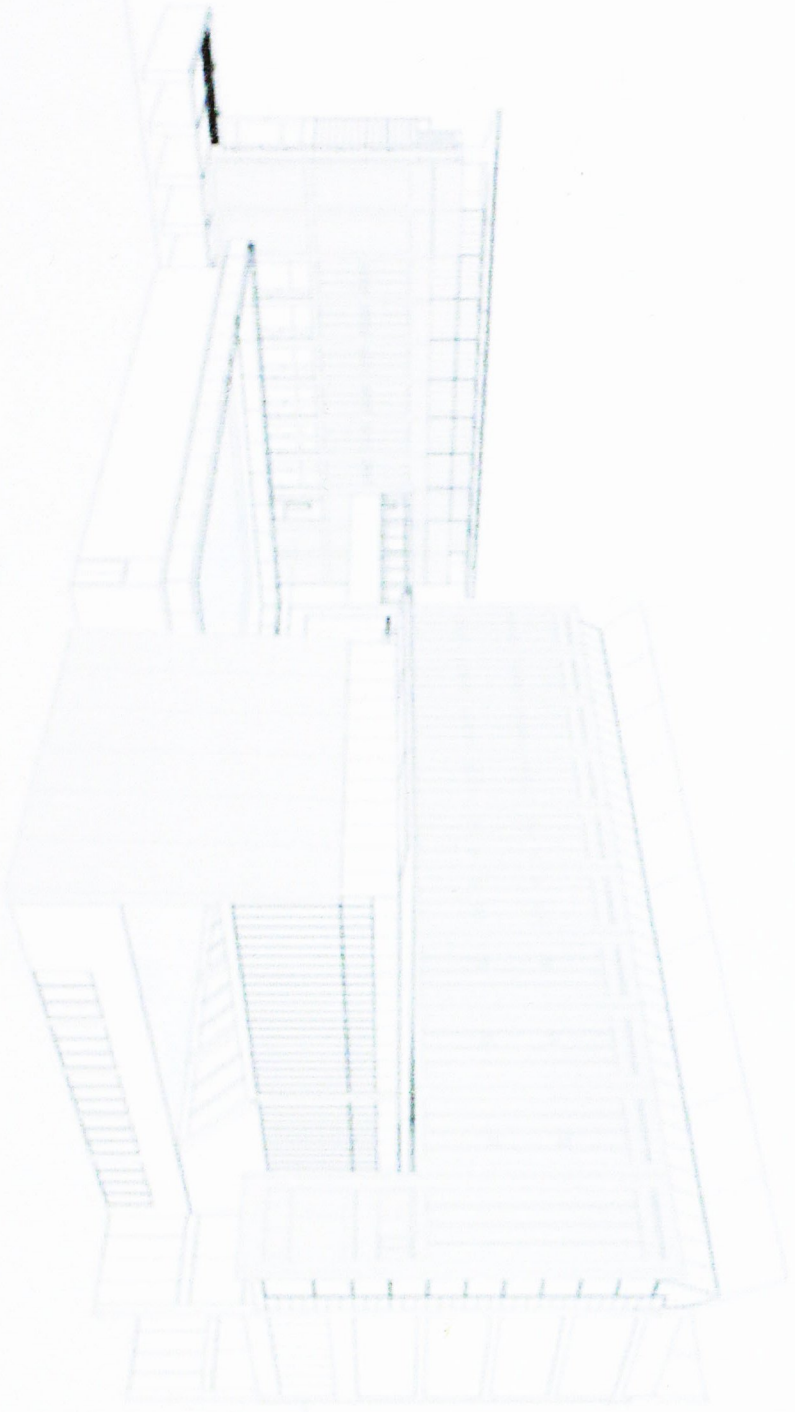
View from the bridge

Lower level of the ramp

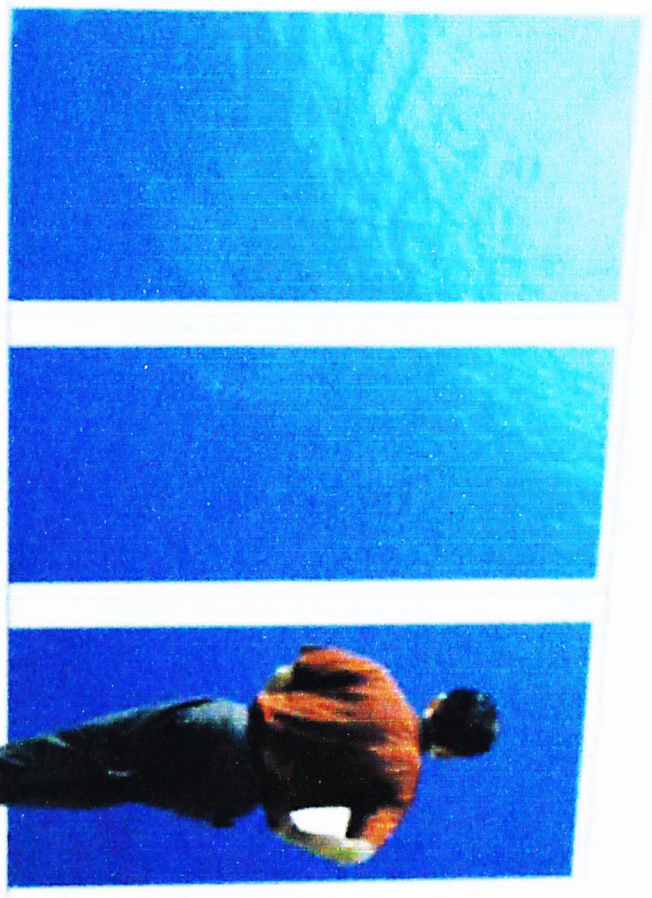
Simulator room and the observatory

Bridge leading to the information centre

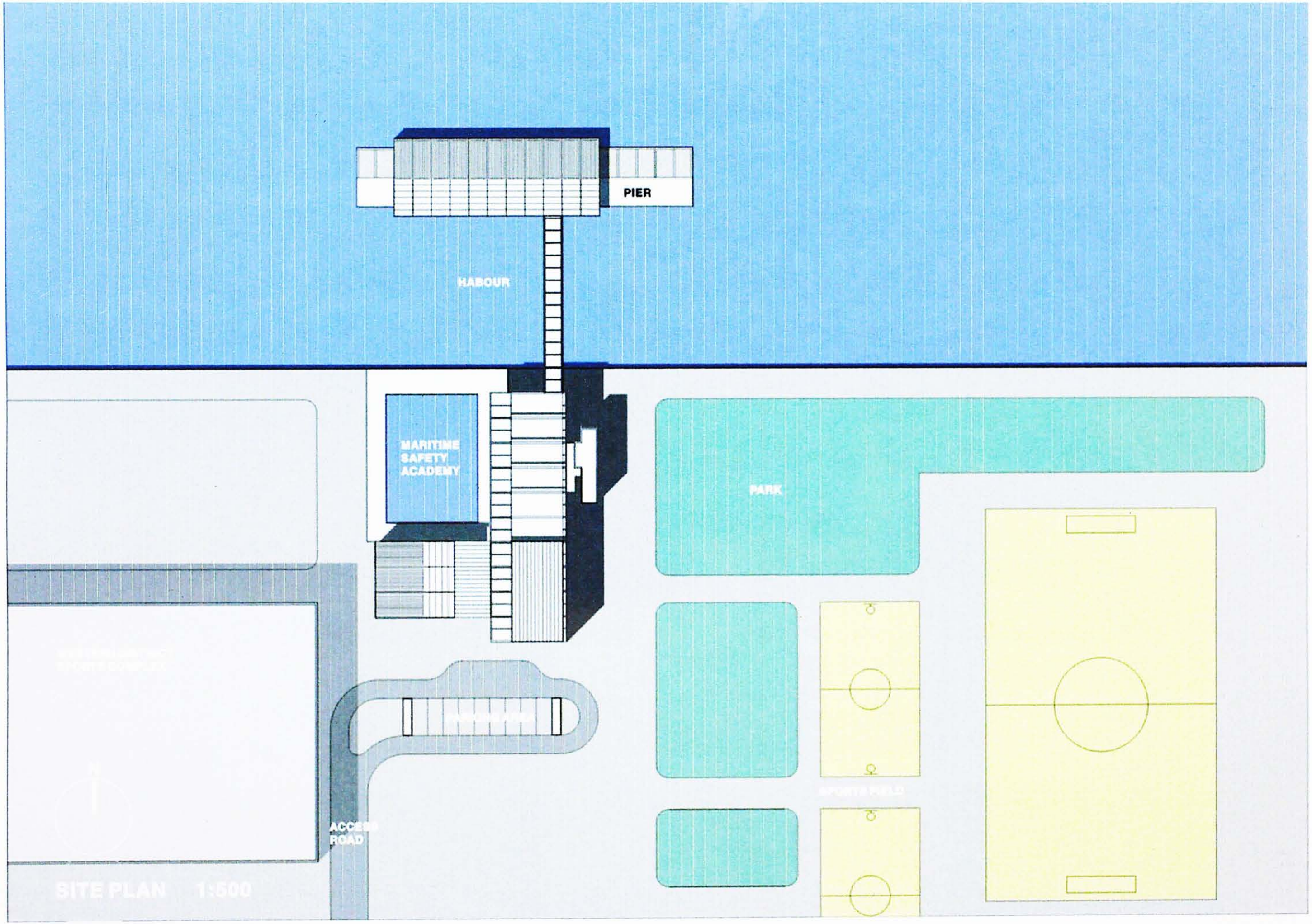
Interior of the information centre

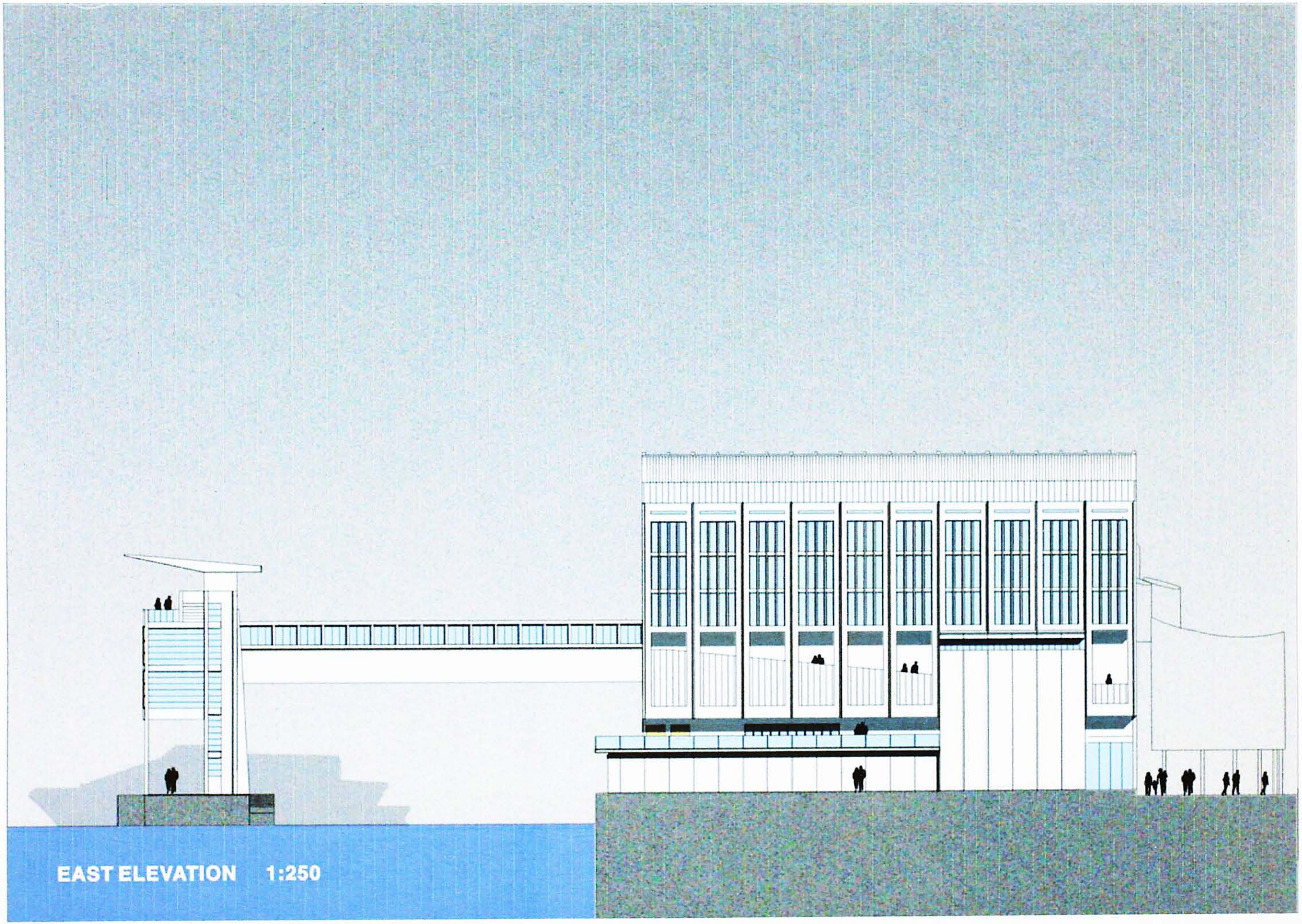


View from the Sports Complex

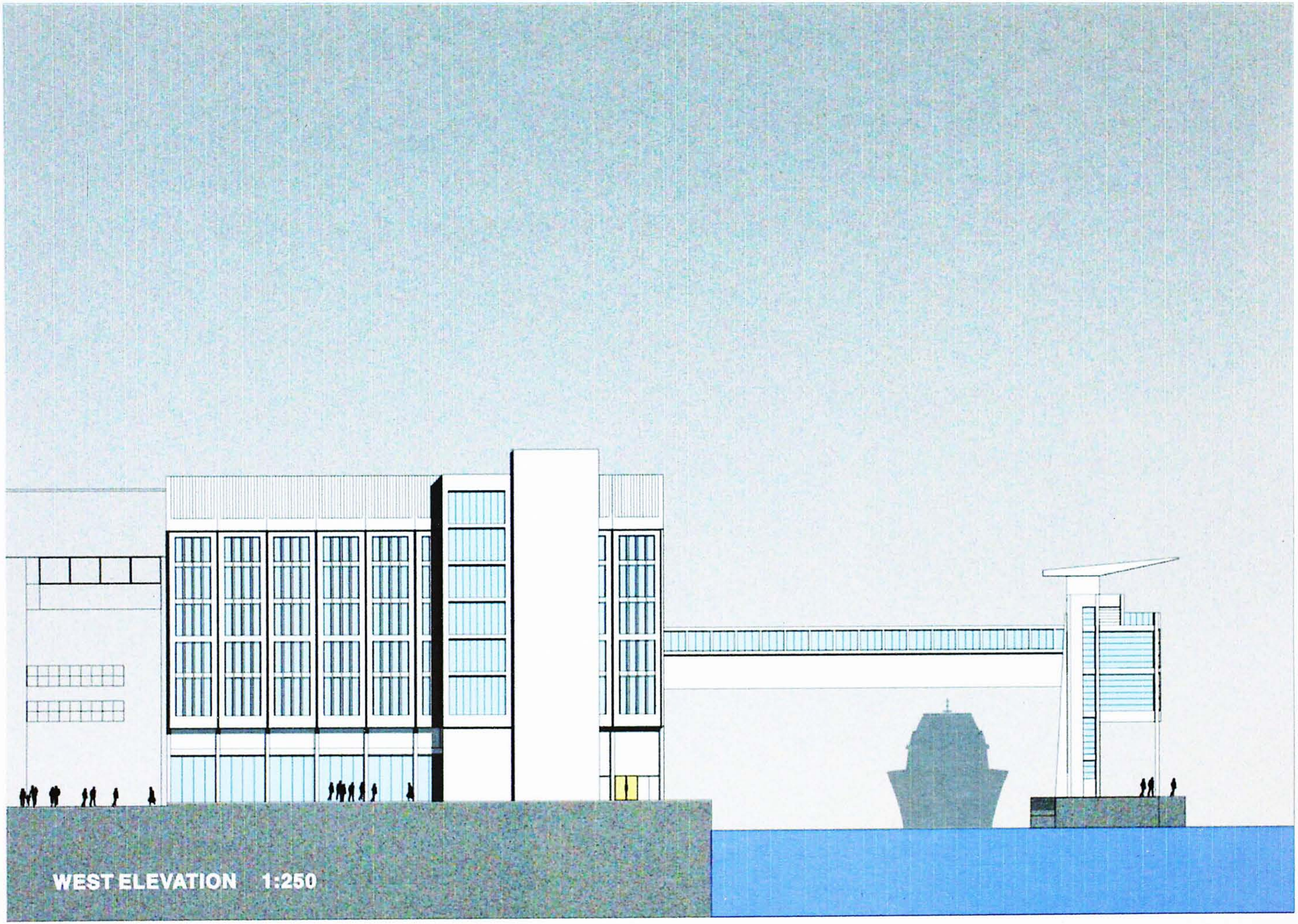


Interior of the underwater observatory

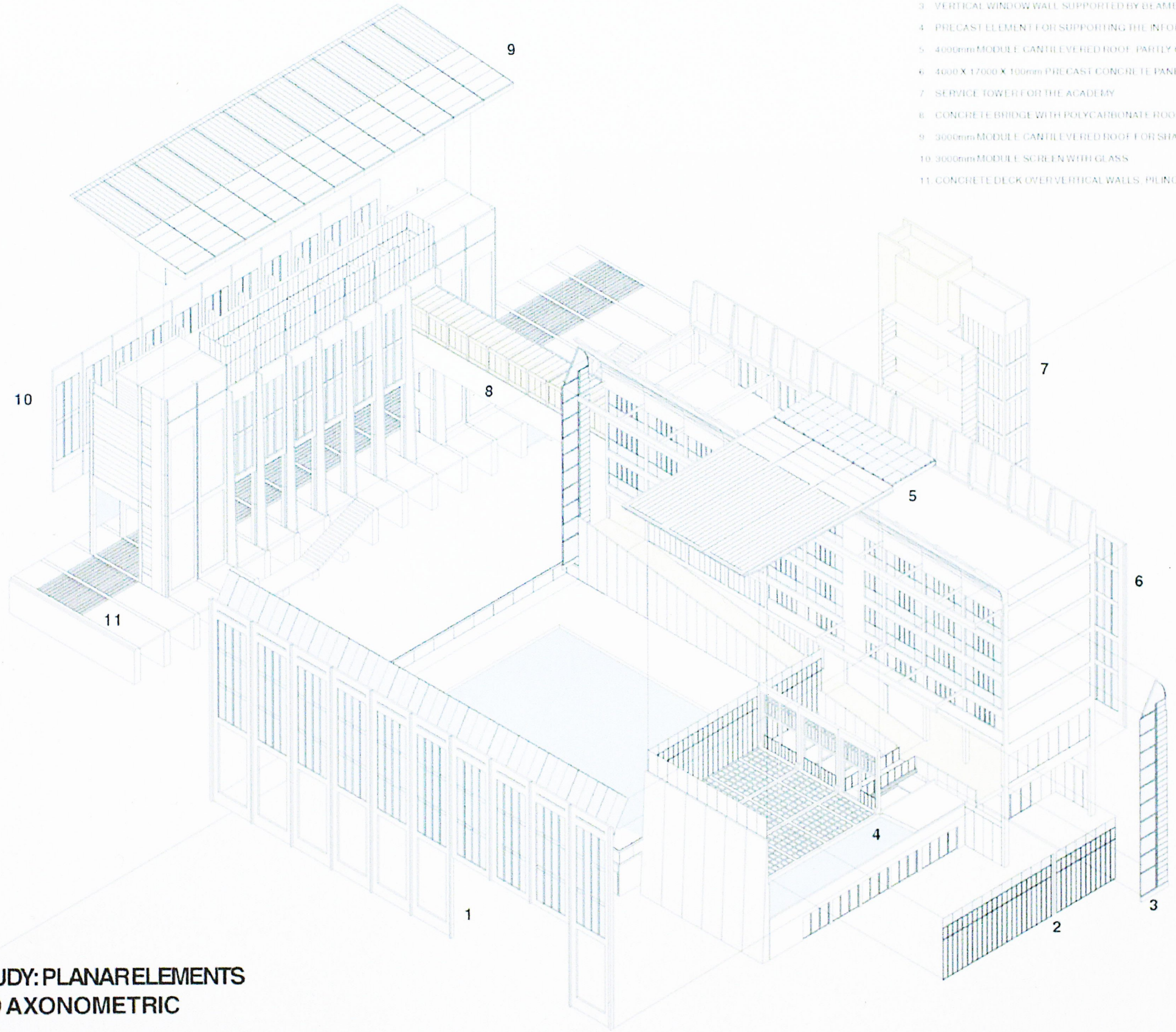

PIER
HABOUR
MARITIME SAFETY ACADEMY
PARK
SPORTS FIELD
ACCESS ROAD
SITE PLAN 1:500



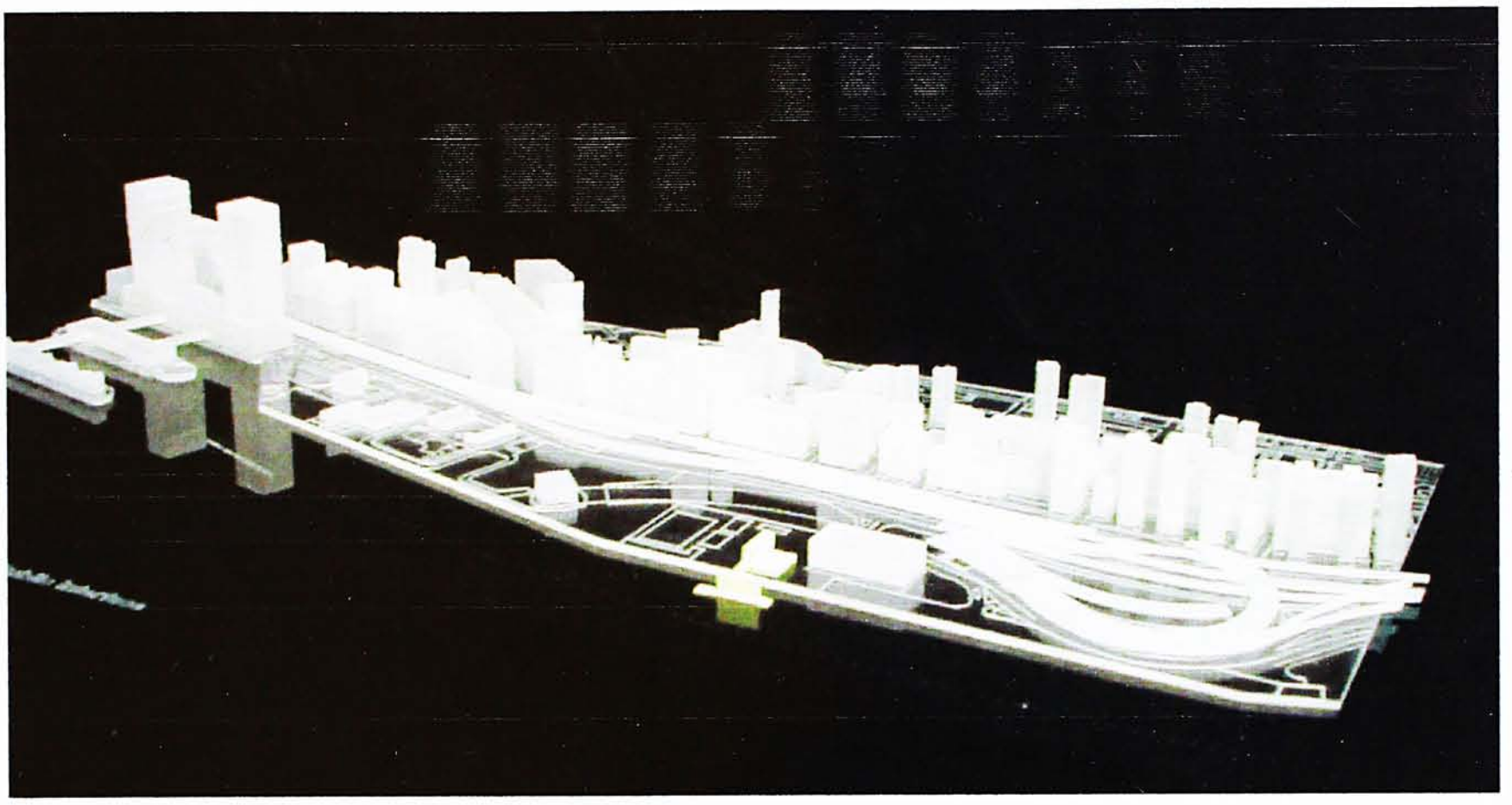
EAST ELEVATION 1:250

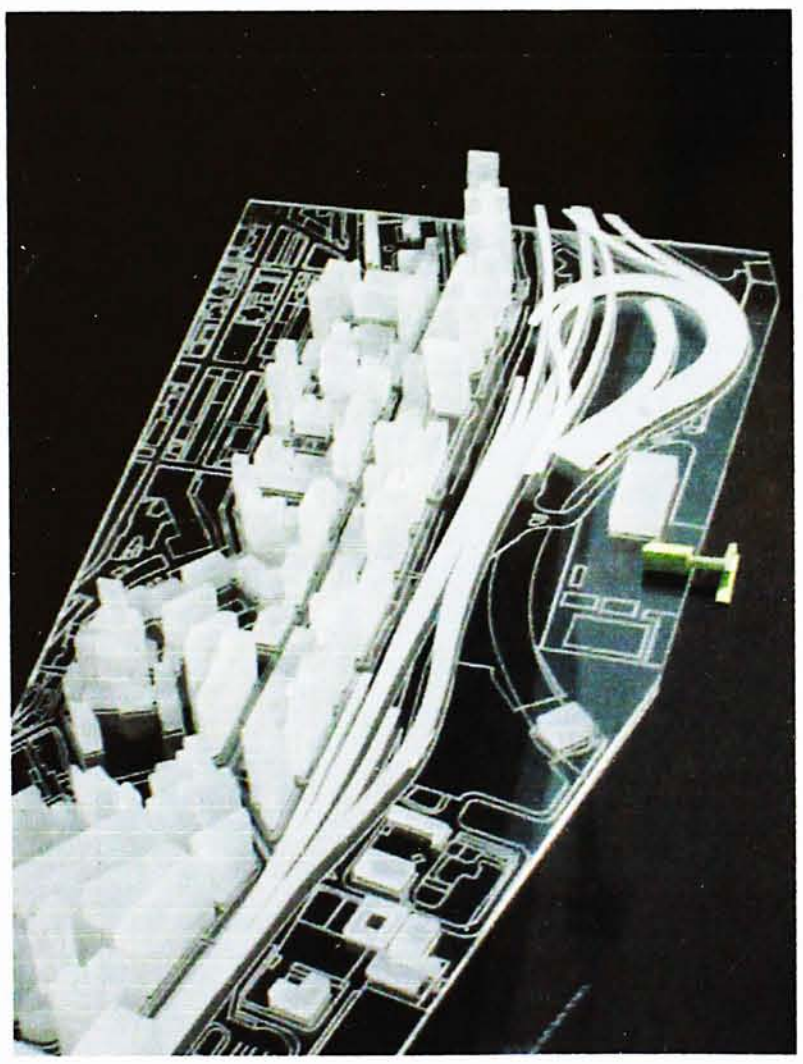

WEST ELEVATION 1:250

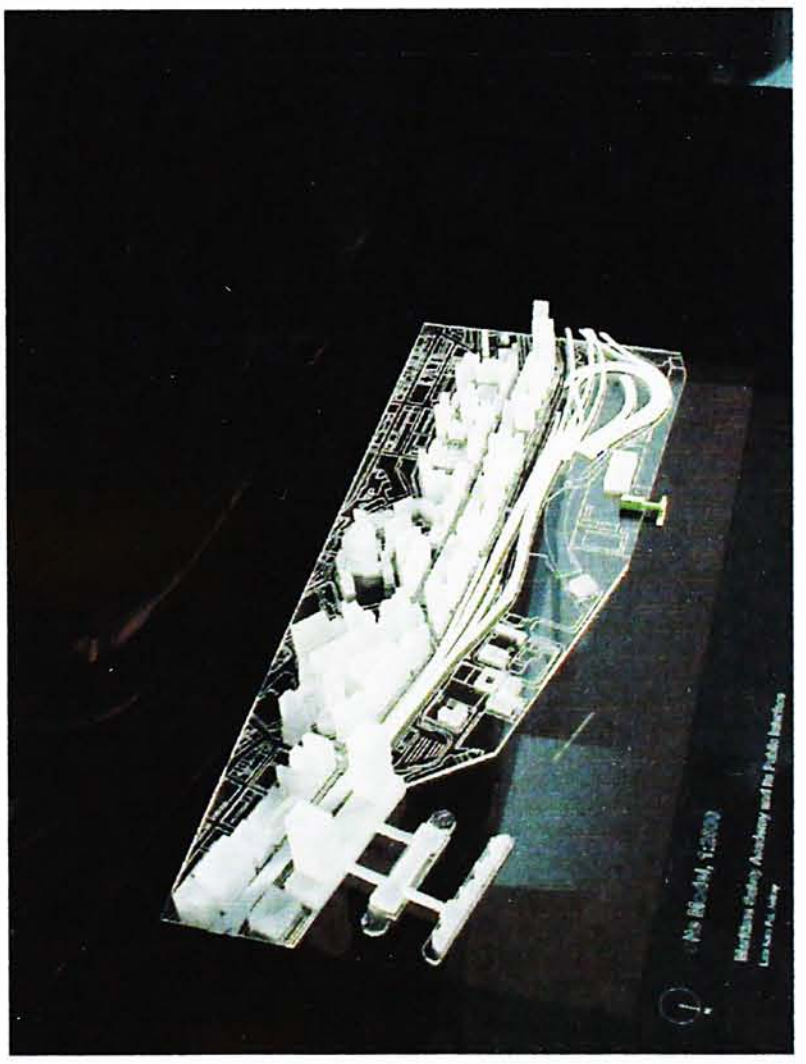
1. 4000 X 17000 X 100mm PRECAST CONCRETE PANEL WITH TRANSLUCENT GLASS
2. SCREEN GLASS ON ALUMINIUM FRAME
3. VERTICAL WINDOW WALL SUPPORTED BY BEAM BEHIND
4. PRECAST ELEMENT FOR SUPPORTING THE INFORMATION CENTRE AND THE ROOF
5. 4000mm MODULE CANTILEVERED ROOF, PARTLY COVERED BY GLASS
6. 4000 X 17000 X 100mm PRECAST CONCRETE PANEL WITH CLEAR GLASS
7. SERVICE TOWER FOR THE ACADEMY
8. CONCRETE BRIDGE WITH POLYCARBONATE ROOF
9. 3000mm MODULE CANTILEVERED ROOF FOR SHADING OF OUTDOOR AREA BELOW
10. 3000mm MODULE SCREEN WITH GLASS
11. CONCRETE DECK OVER VERTICAL WALLS, PILING UNDERNEATH



SPECIAL STUDY: PLANAR ELEMENTS
EXPLODED AXONOMETRIC

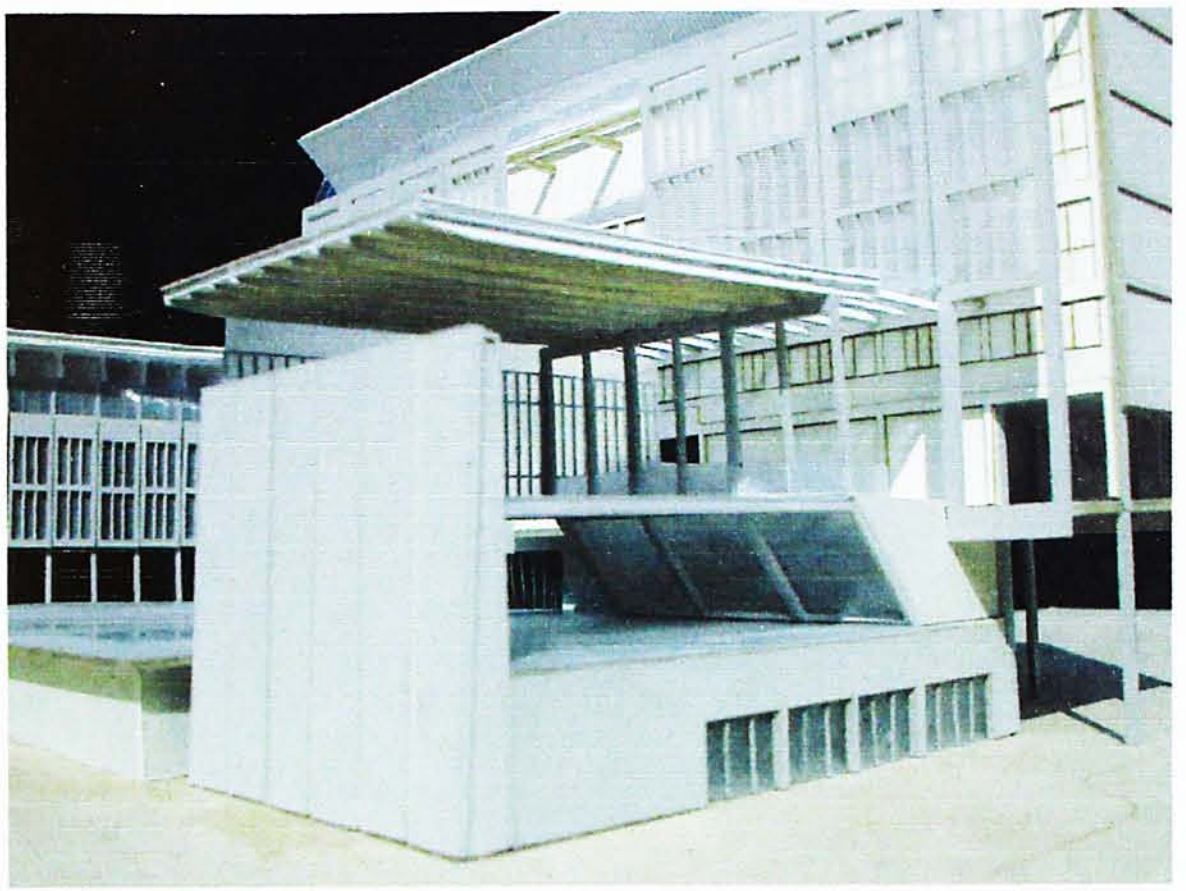


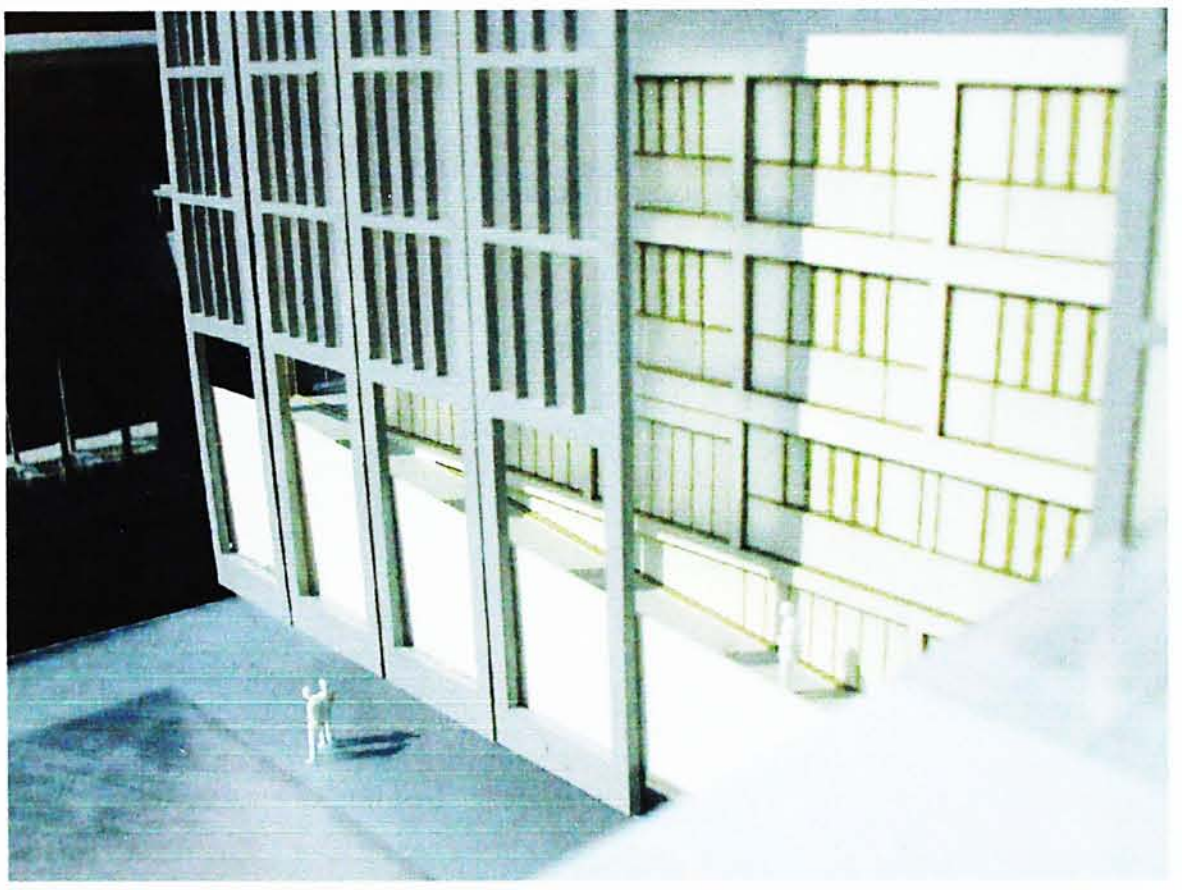


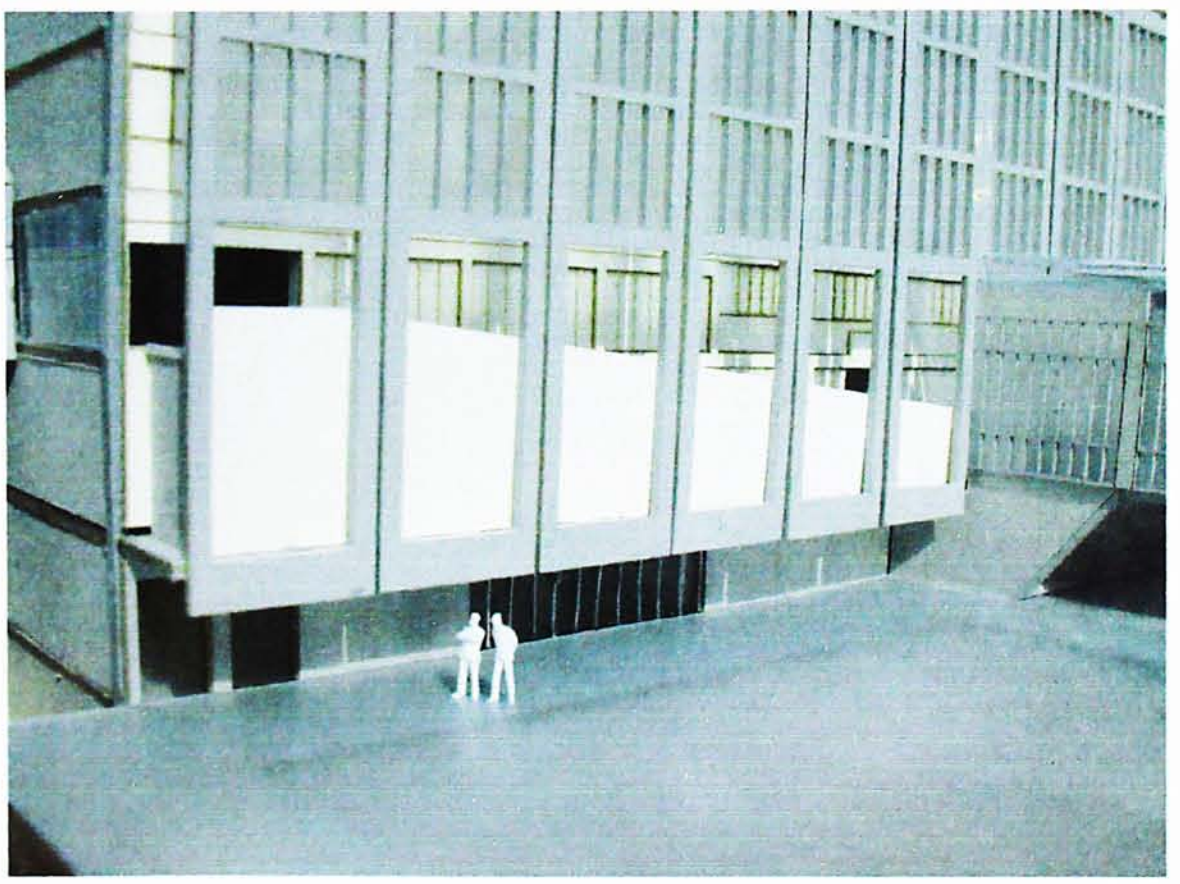


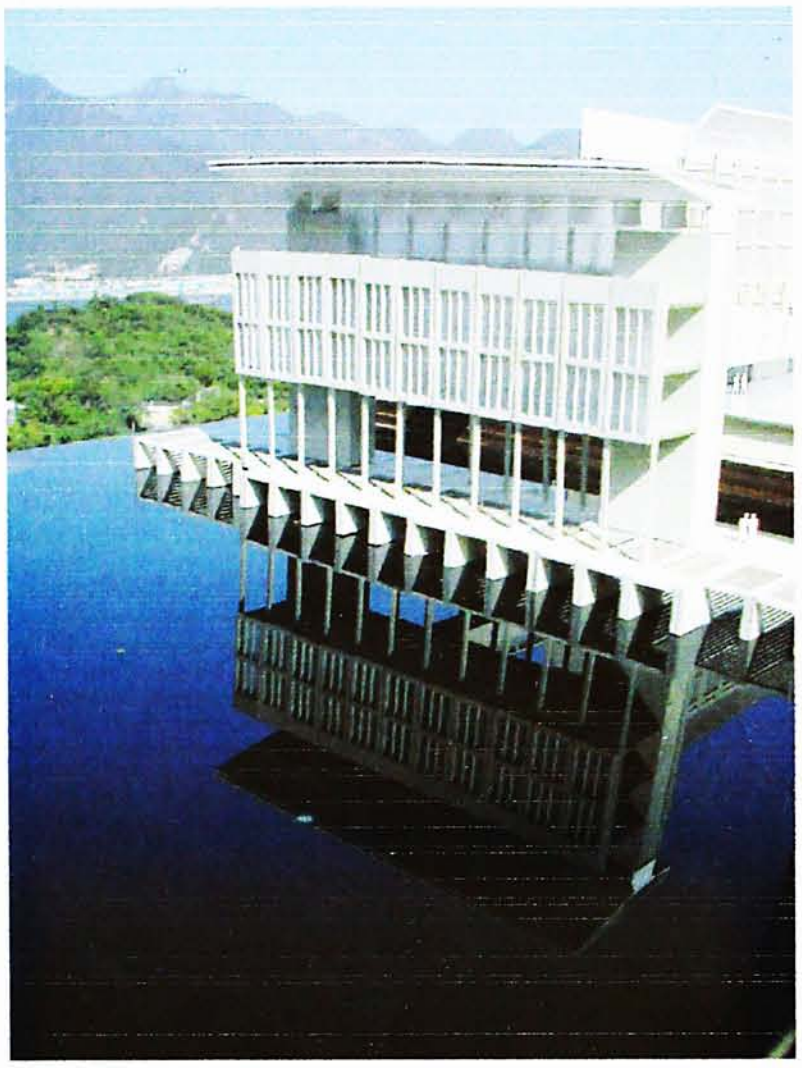
Site Photos

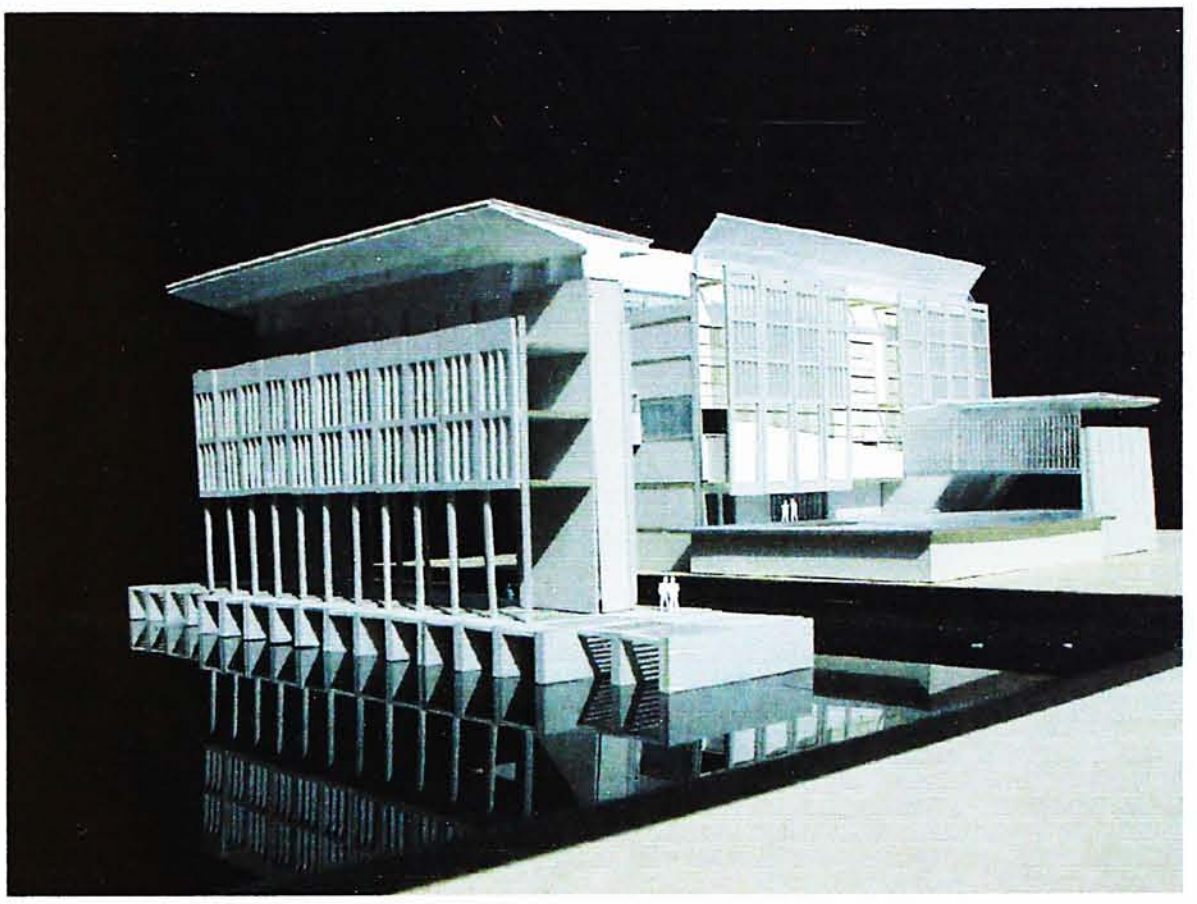
Model photos

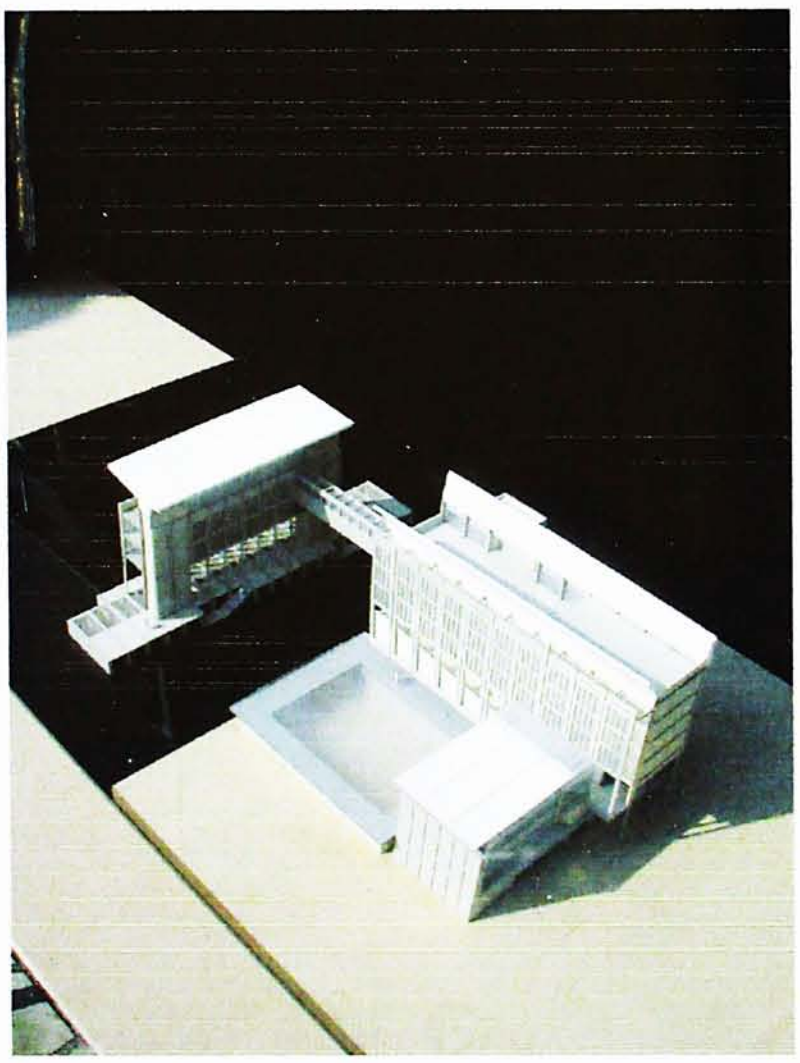


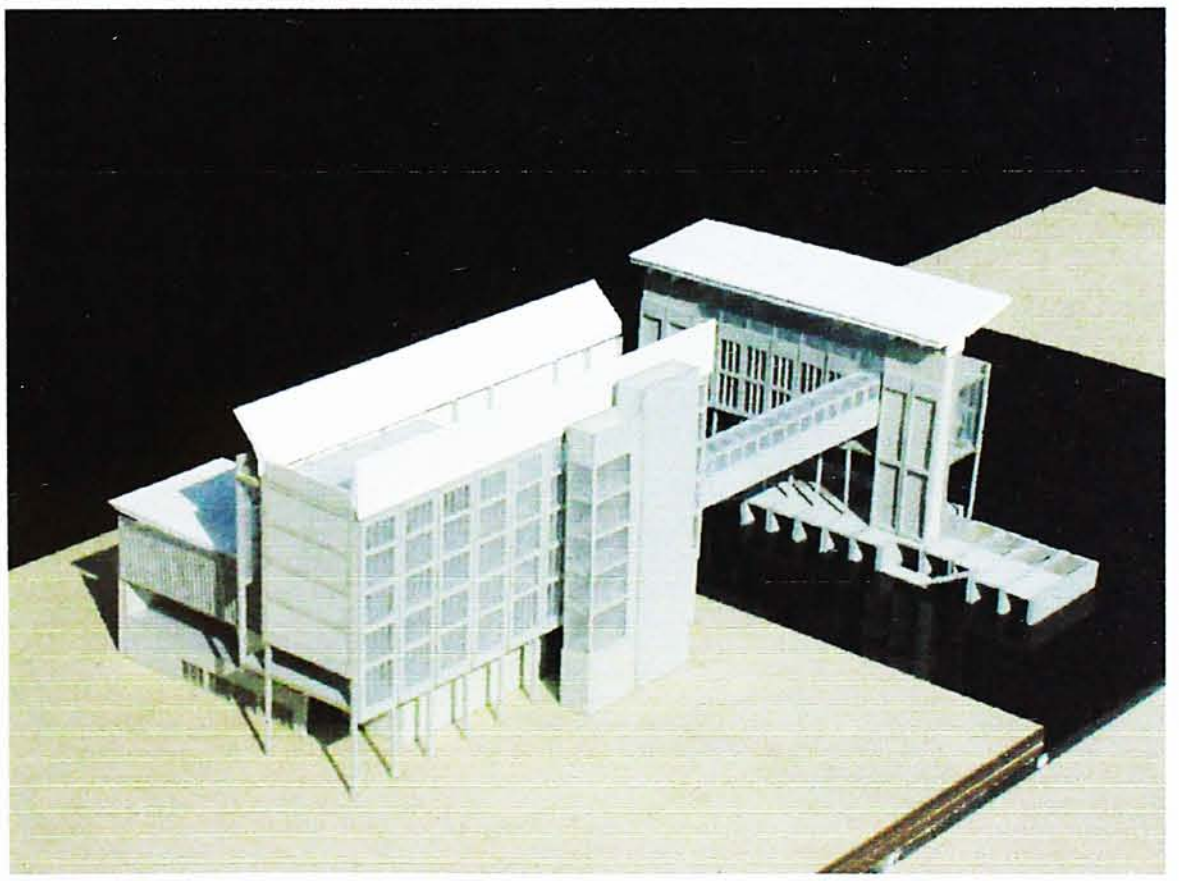


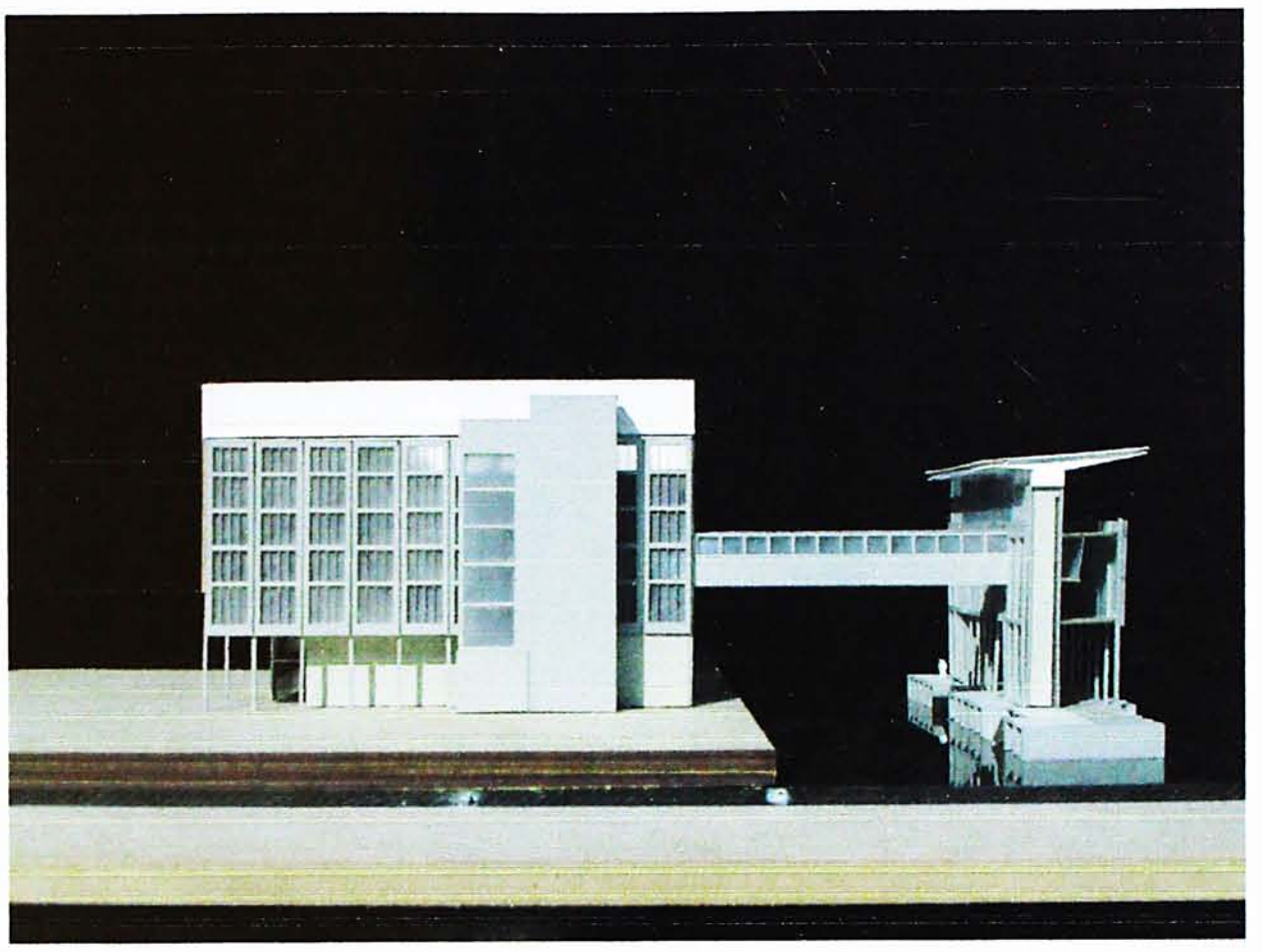


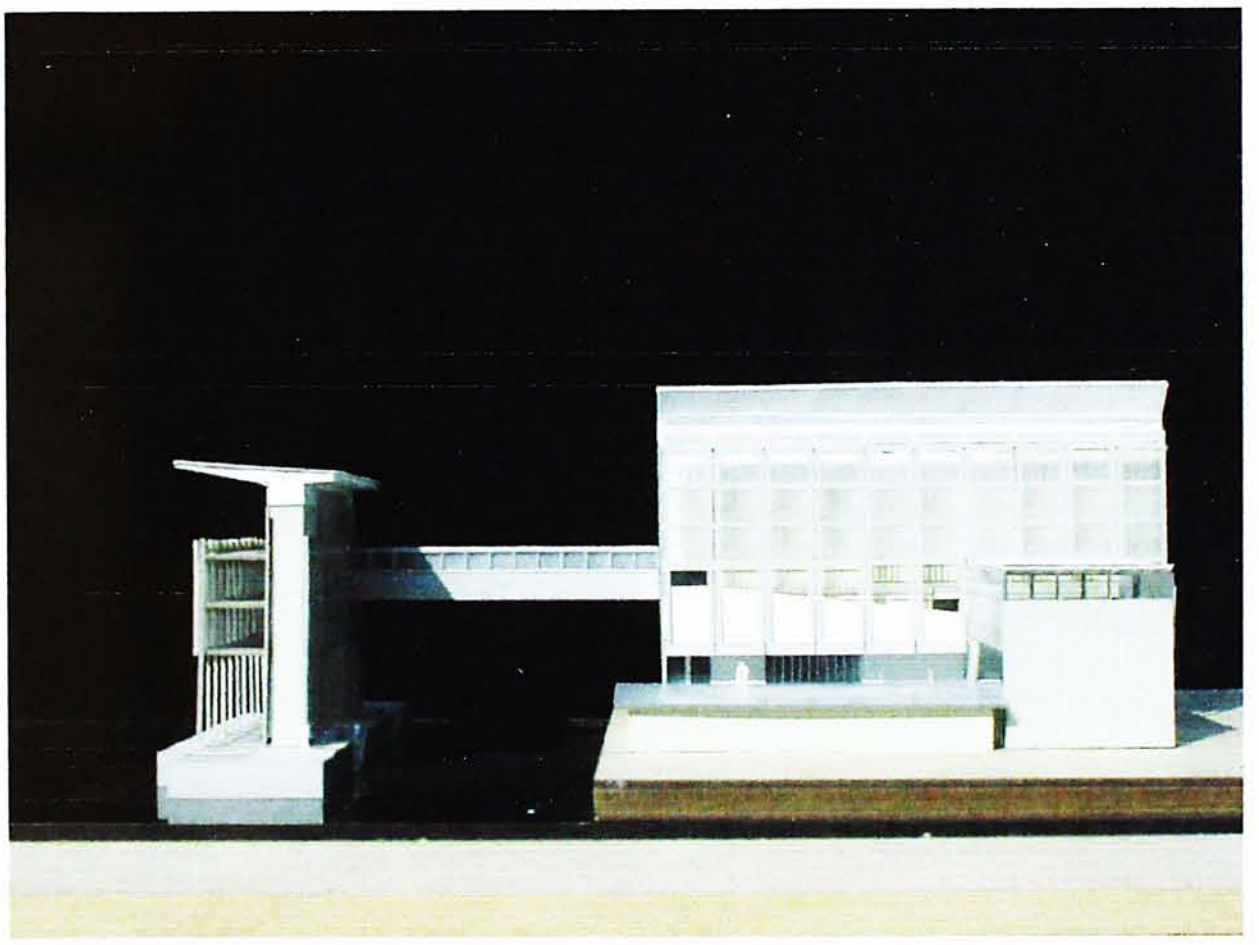


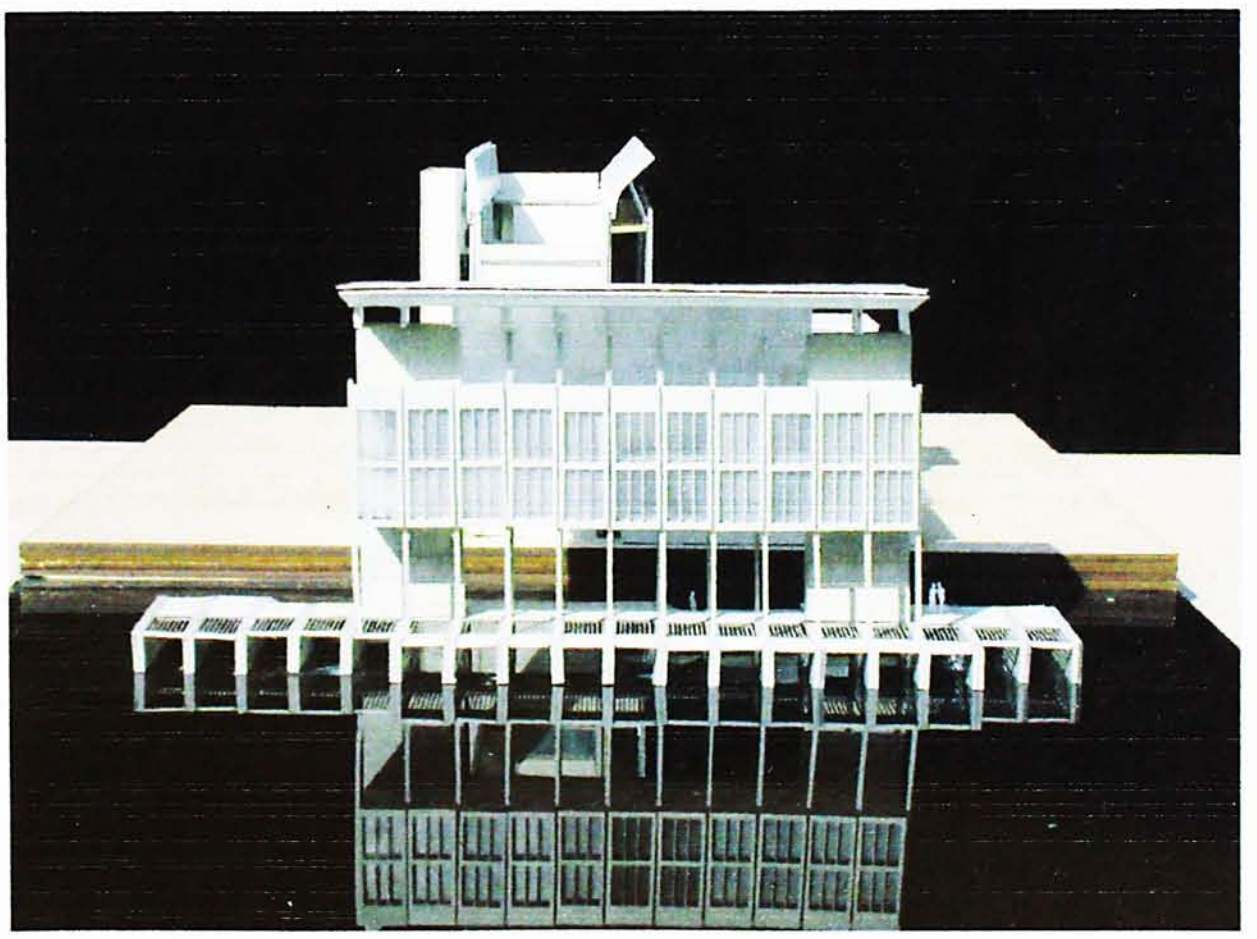












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4. Metropolitan Area Planning Council, *Boston Harbor Islands Comprehensive Plan*, Boston, Massachusetts, 1972.

5. Robert C. Keith, *Baltimore Harbor-A Picture History*, The Johns Hopkins University Press, London, 1991.

6. Richard Hownam-Meek, *The Local Master's Seamanship Manual and Guide to Hong Kong Waters*, Lincoln Green Publishing, Hong Kong, 1983.

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8. Richard Creagh-Oshorne, *This is Racing-Tactics and Strategy in Action*, Nautical Books, London, 1989.

9. A. E. J. Morris, *Precast Concrete in Architecture*, The Whitney Library of Design, 1978.

Part IV Appendix

Appendix I: **Summary Statistics on Port Traffic in Hong Kong as at July 2001, Hong Kong Port and Maritime Board.**

Appendix III: **Articles from Hong Kong Maritime News, Marine Department.**

i. "Search-and-rescue and oil pollution control exercise" p. 3, issue no. 2, September 2000.

ii. "Testing readiness of Hongkong's oil combat contingency" & "Marine Department coordinates search-and-rescue drill" p.3, issue no. 3, December 2000.

iii. "Hong Kong contributes to international study to improve bulk carrier safety" p.5, issue no. 6, September 2001.

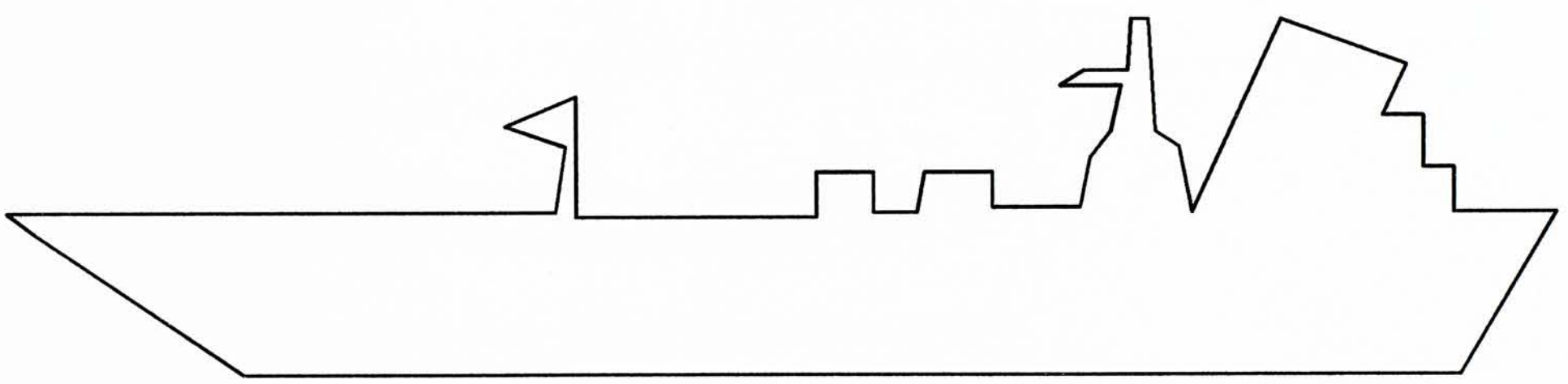
iv. "Hong Kong Marine Department's new training center opens" p. 6, issue no. 6, September 2001.

香港港口運輸統計摘要

Summary Statistics on Port Traffic in Hong Kong

(截止二零零一年七月)

(as at July 2001)



香港港口及航運局
Hong Kong
Port and Maritime Board

Explanatory Notes

Table

Explanatory Notes

<1> Changes in the definition of ocean and river vessels

As from 1 January 1992, the statistical systems on ocean and river vessel trips, containers and cargo have been completely overhauled and redesigned by Marine Department. Reporting procedures, methodology and quality control are enhanced, in addition to full computerisation.

Also, a new definition has been adopted by both Marine Department and Census & Statistics Department in compiling shipping, cargo and container statistics related to ocean and river vessels. The new definition is based on trade route and its difference with the old one is set out below.

Old Definition (until 31 Dec 1992)

Within 24 hours of arrival and before departure, vessels are required to report entry and obtain clearance either at Marine Department's Port Formalities Office (PFO) or its District Marine Offices (DMOs).

Ocean vessels are defined operationally as vessels completing port formalities at PFO. On the other hand, vessels completing port formalities at DMOs are defined as river vessels. In most cases, the latter are vessels below 500 gross registered tonne (GRT) plying between Hong Kong and Pearl River ports (including Macau).

New Definition (effective 1 Jan 1993)

The classification of vessels entering/leaving Hong Kong water into 'ocean' and 'river' is made on the basis of the 'river trade limits' defined under the Shipping and Port Control Ordinance Cap 313. The river trade area broadly includes the Pearl River , Mirs Bay and Macau, and other inland waters in Guangdong and Guangxi which are accessible from waters in the vicinity of Hong Kong.

Ocean vessels are those vessels plying outside the legally defined river trade limits and river vessels are those plying exclusively within the limits.

Because of the changes in definitions, 1992 figures were compiled on both bases so that comparative year-on-year growth rates for 1993 statistics can be derived.

< 2 > A standardised manifest has been in use from 1 Apr 92 (trial period in Jan-Mar 92) to collect river cargo and container throughput data.

< 3> Starting from 1998, all figures except those on ocean trade empty TEUs are compiled by the Census and Statistics Department based on cargo manifests.

On the other hand, figures on ocean trade empty TEUs handled in "Container Terminals" and "Stream and Elsewhere" respectively are based on returns supplied by the Terminal Operators and Marine Department General Declaration Forms.

< 4 > **<u>Rounding of Figures</u>**

There may be a slight discrepancy between the sum of individual items and the total as shown in the tables owing to rounding.

< 5 > Figures on road cargo are compiled based on a new estimation method, which has been adopted as from April 1999.

表1：本港（進出口）總貨運量
Table 1: Total (Inward + Outward) Freight Movement

年度/季度 Year/quarter	海運 Seaborne	河運 River	道路貨運 Road <5>	鐵路貨運 Rail*	空運 Air	合計 Total	海運 Seaborne	河運 River	道路貨運 Road <5>	鐵路貨運 Rail*	空運 Air	合計 Total
	千公噸 '000 tonnes						與上年同期比較的升幅(%) Year-on-year growth rate (%)					
1989	64,655	9,027	7,960	2,369	730	84,741	5.4	-10.4	18.1	-1.3	5.2	4.3
1990	66,008	9,287	12,412	2,389	802	90,898	2.1	2.9	<5>	0.8	9.9	7.3
1991	76,445	11,147	17,398	2,242	850	108,082	15.8	20.0	40.2	-6.1	6.0	18.9
1992	83,446 <1>	19,333 <1,2>	22,548	2,071	957	128,356	<1>	<1>	29.6	-7.6	12.6	18.8
1993	96,100	22,038	28,581	1,873	1,139	149,730	15.2	14.0	26.8	-9.6	19.0	16.7
1994	110,947	30,079	32,570	1,628	1,293	176,516	15.4	36.5	14.0	-13.1	13.5	17.9
1995	127,175	28,732	34,290	1,442	1,458	193,096	14.6	-4.5	5.3	-11.4	12.8	9.4
1996	125,838	31,461	35,159	1,050	1,563	195,072	-1.1	9.5	2.5	-27.2	7.3	1.0
1997	133,301	35,928	36,408	810	1,786	208,234	5.9	14.2	3.6	-22.8	14.3	6.7
1998	127,482	39,688	36,152	555	1,629	205,506	-4.4	10.5	-0.7	-31.5	-8.8	-1.3
1999	128,222	40,616	38,415	554	1,974	209,781	0.6	2.3	6.3	-0.3	21.2	2.1
2000	130,937	43,706	39,933	535	2,241	217,351	2.1	7.6	4.0	-3.3	13.5	3.6
2001												
一月 Jan	10,462	3,644	2,432	29	143	16,710	-3.7	-3.3	-28.0	-38.8	-11.7	-8.3
二月 Feb	9,617	3,430	2,659	30	151	15,887	13.7	35.4	31.9	11.1	10.9	20.6
三月 Mar	11,738	4,240	3,367	40	189	19,574	11.8	15.6	-3.8	-22.3	-3.2	9.2
四月 Apr	11,361	4,230	3,096	38	165	18,890	2.4	20.5	-5.5	-22.9	-11.5	4.2
五月 May	11,501	3,892	3,205	39	159	18,796	2.4	6.9	-6.7	-15.5	-12.4	1.4
六月 Jun	10,627	3,850	3,243	38	164 P	17,922	-4.4	3.6	-6.0	-15.3	-9.2 P	-3.1
七月 Jul	11,352 P	3,819 P	3,338	37	162 P	18,708	-2.1 P	9.6 P	-9.0	-15.8	-14.2 P	-1.5
八月 Aug												
九月 Sep												
十月 Oct												
十一月 Nov												
十二月 Dec												
累計 Cumulative												
2001												
一月 Jan	10,462	3,644	2,432	29	143	16,710	-3.7	-3.3	-28.0	-38.8	-11.7	-8.3
二月 Feb	20,079	7,074	5,091	59	294	32,597	3.9	12.2	-5.6	-20.7	-1.4	3.8
三月 Mar	31,817	11,314	8,458	99	483	52,171	6.7	13.5	-4.9	-21.3	-2.1	5.8
四月 Apr	43,178	15,544	11,554	137	648	71,061	5.5	15.3	-5.1	-21.8	-4.7	5.4
五月 May	54,680	19,436	14,759	176	807	89,858	4.8	13.5	-5.4	-20.5	-6.3	4.5
六月 Jun	65,307	23,285	18,002	215	971 P	107,780	3.2	11.7	-5.5	-19.6	-6.8 P	3.2
七月 Jul	76,659 P	27,104 P	21,340	252	1,133 P	126,488	2.4 P	11.4 P	-6.1	-19.0	-7.9 P	2.5
八月 Aug												
九月 Sep												
十月 Oct												
十一月 Nov												
十二月 Dec												

資料來源：
(1) 海運 ：政府統計處
(2) 1989 - 1993年河運：海事處
1994 - 1997年河運：香港港口及航運局
1998 - 2001年河運 ：政府統計處
(3) 鐵路貨運：九廣鐵路公司
(4) 道路貨運：香港海關
(5) 空運：民航處

Source:
(1) Seaborne cargo : Census & Statistics Department
(2) River cargo 1989 - 1993: Marine Department
River cargo 1994 - 1997: Hong Kong Port and Maritime Board
River cargo 1998 - 2001 : Census & Statistics Department
(3) Rail cargo : Kowloon Canton Railway Corporation
(4) Road cargo : Customs & Excise Department
(5) Air cargo : Civil Aviation Department

* 包括用鐵路運輸的家畜
<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<5> 詳情請參閱第iii頁註釋。
N.A. 沒有數字 P 初步數字 R 修訂數字

* include livestock transported on rail.
<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
<5> Please refer to note 5 of page iii.
N.A. Not Available P Preliminary figures R Revised figures

表2：本港進口貨運量
Table 2: Inward Freight Movement

年度/季度 Year/quarter	海運 Seaborne	河運 River	道路貨運 Road <5>	鐵路貨運 Rail*	空運 Air	合計 Total	海運 Seaborne	河運 River	道路貨運 Road <5>	鐵路貨運 Rail*	空運 Air	合計 Total
	千公噸 '000 tonnes						與上年同期比較的升幅(%) Year-on-year growth rate (%)					
1989	45,792	5,477	4,103	1,916	307	57,595	3.5	-8.9	16.4	-0.1	7.4	2.9
1990	46,242	6,026	6,287	2,022	353	60,929	1.0	10.0	<5>	5.5	14.8	5.8
1991	52,899	6,722	8,721	1,904	372	70,618	14.4	11.6	38.7	-5.9	5.5	15.9
1992	58,923 <1>	11,627 <1,2>	12,452	1,702	423	85,127	<1>	<1>	42.8	-10.6	13.6	20.5
1993	68,226	11,783	13,618	1,507	513	95,647	15.8	1.3	9.4	-11.4	21.3	12.4
1994	76,672	16,172	15,203	1,283	606	109,936	12.4	37.2	11.6	-14.9	18.2	14.9
1995	87,048	14,723	16,198	1,126	685	119,780	13.5	-9.0	6.5	-12.2	13.2	9.0
1996	86,694	14,235	17,343	795	734	119,800	-0.4	-3.3	7.1	-29.4	7.1	0.0
1997	91,950	15,563	18,333	636	840	127,322	6.1	9.3	5.7	-20.0	14.4	6.3
1998	90,104	16,747	18,465	417	775	126,507	-2.0	7.6	0.7	-34.4	-7.8	-0.6
1999	88,621	17,684	20,500	380	841	128,027	-1.6	5.6	11.0	-8.9	8.6	1.2
2000	88,003	18,932	22,142	403	953	130,432	-0.7	7.1	8.0	5.9	13.2	1.9
2001												
一月 Jan	6,968	1,615	1,455	24	65	10,127	-5.0	-5.2	-23.4	-28.0	-9.2	-8.3
二月 Feb	6,846	1,512	1,377	24	71	9,830	17.3	44.1	33.3	26.5	14.7	22.9
三月 Mar	7,949	1,900	1,839	31	82	11,801	12.0	9.9	-2.4	-21.4	2.0	9.0
四月 Apr	7,662	1,910	1,639	31	74	11,316	0.8	26.7	-8.3	-16.9	-6.3	2.8
五月 May	8,068	1,783	1,698	30	73	11,652	7.3	16.9	-8.3	-12.2	-6.3	5.9
六月 Jun	7,169	1,765	1,777	30	75 P	10,816	-5.4	13.8	-6.7	-16.3	-5.1 P	-3.0
七月 Jul	7,699 P	1,773 P	1,866	29	72 P	11,439	-0.2 P	13.9 P	-9.4	-14.6	-11.3 P	-0.1
八月 Aug												
九月 Sep												
十月 Oct												
十一月 Nov												
十二月 Dec												
累計 Cumulative												
2001												
一月 Jan	6,968	1,615	1,455	24	65	10,127	-5.0	-5.2	-23.4	-28.0	-9.2	-8.3
二月 Feb	13,814	3,127	2,832	48	136	19,957	4.9	13.6	-3.4	-8.2	1.9	4.8
三月 Mar	21,763	5,027	4,671	79	218	31,758	7.4	12.2	-3.1	-13.9	1.9	6.3
四月 Apr	29,425	6,936	6,310	110	292	43,073	5.6	15.8	-4.5	-14.8	-0.3	5.4
五月 May	37,494	8,720	8,008	140	365	54,727	6.0	16.1	-5.3	-14.3	-1.6	5.5
六月 Jun	44,662	10,484	9,785	171	440 P	65,542	4.0	15.7	-5.6	-14.6	-2.2 P	4.0
七月 Jul	52,362 P	12,257 P	11,651	200	512 P	76,982	3.3 P	15.4 P	-6.2	-14.6	-3.6 P	3.4
八月 Aug												
九月 Sep												
十月 Oct												
十一月 Nov												
十二月 Dec												

資料來源：
(1) 海運 ：政府統計處
(2) 1989 - 1993年河運：海事處
1994 - 1997年河運：香港港口及航運局
1998 - 2001年河運 ：政府統計處
(3) 鐵路貨運：九廣鐵路公司
(4) 道路貨運：香港海關
(5) 空運：民航處

Source:
(1) Seaborne cargo : Census & Statistics Department
(2) River cargo 1989 - 1993: Marine Department
River cargo 1994 - 1997: Hong Kong Port and Maritime Board
River cargo 1998 - 2001 : Census & Statistics Department
(3) Rail cargo : Kowloon Canton Railway Corporation
(4) Road cargo : Customs & Excise Department
(5) Air cargo : Civil Aviation Department

* 包括用鐵路運輸的家畜
<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<5> 詳情請參閱第iii頁註釋。
N.A. 沒有數字 P 初步數字 R 修訂數字

* include livestock transported on rail.
<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
<5> Please refer to note 5 of page iii.
N.A. Not Available P Preliminary figures R Revised figures

表3：本港出口貨運量
Table 3: Outward Freight Movement

年度/季度 Year/quarter	海運 Seaborne	河運 River	道路貨運 Road <5>	鐵路貨運 Rail	空運 Air	合計 Total	海運 Seaborne	河運 River	道路貨運 Road <5>	鐵路貨運 Rail*	空運 Air	合計 Total
	千公噸 '000 tonnes						與上年同期比較的升幅(%) Year-on-year growth rate (%)					
1989	18,863	3,549	3,858	453	423	27,145	10.6	-12.6	19.9	-6.4	3.6	7.6
1990	19,766	3,262	6,125	367	449	29,968	4.8	-8.1	<5>	-19.0	6.2	10.4
1991	23,546	4,425	8,676	339	478	37,464	19.1	35.7	41.7	-7.7	6.4	25.0
1992	24,524 <1>	7,706 <1,2>	10,096	369	534	43,229	<1>	<1>	16.4	8.9	11.9	15.4
1993	27,873	10,255	14,963	365	627	54,083	13.7	33.1	48.2	-0.9	17.3	25.1
1994	34,274	13,907	17,368	345	687	66,581	23.0	35.6	16.1	-5.5	9.6	23.1
1995	40,127	14,009	18,092	316	772	73,316	17.1	0.7	4.2	-8.5	12.5	10.1
1996	39,145	17,226	17,817	255	830	75,272	-2.4	23.0	-1.5	-19.2	7.4	2.7
1997	41,351	20,365	18,075	174	947	80,912	5.6	18.2	1.5	-31.7	14.1	7.5
1998	37,378	22,941	17,688	138	854	78,999	-9.6	12.7	-2.1	-20.9	-9.8	-2.4
1999	39,601	22,932	17,915	173	1,133	81,754	5.9	0.0	1.3	25.7	32.7	3.5
2000	42,934	24,773	17,791	133	1,288	86,919	8.4	8.0	-0.7	-23.4	13.7	6.3
2001												
一月 Jan	3,494	2,029	977	5	77	6,582	-1.1	-1.7	-33.9	-64.3	-14.9	-8.3
二月 Feb	2,771	1,918	1,282	6	80	6,057	5.6	29.2	30.4	-25.0	7.7	17.1
三月 Mar	3,789	2,340	1,528	9	107	7,773	11.2	20.7	-5.4	-25.0	-6.8	9.7
四月 Apr	3,699	2,320	1,456	7	91	7,573	5.7	15.8	-2.2	-41.7	-15.2	6.5
五月 May	3,433	2,109	1,506	9	86	7,143	-7.7	-0.3	-4.8	-25.0	-16.9	-5.1
六月 Jun	3,458	2,085	1,466	8	89 P	7,106	-2.2	-3.7	-5.1	-11.1	-12.3 P	-3.4
七月 Jul	3,653 P	2,046 P	1,472	8	90 P	7,269	-5.9 P	6.1 P	-8.5	-20.0	-16.5 P	-3.6
八月 Aug												
九月 Sep												
十月 Oct												
十一月 Nov												
十二月 Dec												
累計 Cumulative												
2001												
一月 Jan	3,494	2,029	977	5	77	6,582	-1.1	-1.7	-33.9	-64.3	-14.9	-8.3
二月 Feb	6,265	3,947	2,259	11	157	12,639	1.8	11.2	-8.2	-50.0	-4.7	2.3
三月 Mar	10,054	6,287	3,787	20	264	20,412	5.1	14.5	-7.1	-41.2	-5.6	5.0
四月 Apr	13,753	8,607	5,243	27	355	27,985	5.3	14.9	-5.8	-41.3	-8.2	5.4
五月 May	17,186	10,716	6,749	36	441	35,128	2.4	11.5	-5.6	-37.9	-10.1	3.1
六月 Jun	20,644	12,801	8,215	44	530 P	42,234	1.6	8.7	-5.5	-34.3	-10.5 P	1.9
七月 Jul	24,297 P	14,847 P	9,687	52	620 P	49,503	0.4 P	8.3 P	-6.0	-32.5	-11.4 P	1.1
八月 Aug												
九月 Sep												
十月 Oct												
十一月 Nov												
十二月 Dec												

資料來源：
(1) 海運 ：政府統計處
(2) 1989 - 1993年河運：海事處
1994 - 1997年河運：香港港口及航運局
1998 - 2001年河運 ：政府統計處
(3) 鐵路貨運：九廣鐵路公司
(4) 道路貨運：香港海關
(5) 空運：民航處

Source:
(1) Seaborne cargo : Census & Statistics Department
(2) River cargo 1989 - 1993: Marine Department
River cargo 1994 - 1997: Hong Kong Port and Maritime Board
River cargo 1998 - 2001 : Census & Statistics Department
(3) Rail cargo : Kowloon Canton Railway Corporation
(4) Road cargo : Customs & Excise Department
(5) Air cargo : Civil Aviation Department

* 包括用鐵路運輸的家畜
<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<5> 詳情請參閱第iii頁註釋。
N.A. 沒有數字 P 初步數字 R 修訂數字

* include livestock transported on rail.
<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
<5> Please refer to note 5 of page iii.
N.A. Not Available P Preliminary figures R Revised figures

表4：港口(海運＋河運)貨物吞吐量
Table 4: Port (Seaborne + River) Cargo Throughput

年份/季度 Year/quarter	抵港 Inward 千公噸 '000 tonnes	抵港 Inward 與上年同期比較的升幅(%) Year-on-year growth rate (%)	離港 Outward 千公噸 '000 tonnes	離港 Outward 與上年同期比較的升幅(%) Year-on-year growth rate (%)	合計 Total 千公噸 '000 tonnes	合計 Total 與上年同期比較的升幅(%) Year-on-year growth rate (%)
1989	51,269	2.0	22,412	6.1	73,681	3.2
1990	52,268	1.9	23,028	2.7	75,295	2.2
1991	59,621	14.1	27,971	21.5	87,592	16.3
1992	70,550 <1,2>	<1>	32,230 <1,2>	<1>	102,779 <1,2>	<1>
1993	80,009	13.4	38,128	18.3	118,138	14.9
1994	92,844	16.0	48,181	26.4	141,025	19.4
1995	101,770	9.6	54,136	12.4	155,907	10.6
1996	100,928	-0.8	56,371	4.1	157,299	0.9
1997	107,513	6.5	61,716	9.5	169,229	7.6
1998	106,851	-0.6	60,319	-2.3	167,170	-1.2
1999	106,305	-0.5	62,533	3.7	168,838	1.0
2000	106,935	0.6	67,707	8.3	174,642	3.4
2001						
一月 Jan	8,583	-5.0	5,523	-1.3	14,106	-3.6
二月 Feb	8,358	21.4	4,689	14.1	13,047	18.7
三月 Mar	9,849	11.6	6,129	14.6	15,978	12.8
四月 Apr	9,572	5.1	6,019	9.4	15,591	6.7
五月 May	9,852	9.0	5,542	-5.0	15,394	3.5
六月 Jun	8,933	-2.1	5,544	-2.7	14,477	-2.4
七月 Jul	9,472 P	2.2 P	5,699 P	-1.9 P	15,171 P	0.6 P
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	8,583	-5.0	5,523	-1.3	14,106	-3.6
二月 Feb	16,941	6.4	10,212	5.2	27,153	5.9
三月 Mar	26,790	8.3	16,341	8.6	43,131	8.4
四月 Apr	36,362	7.4	22,360	8.8	58,722	7.9
五月 May	46,213	7.7	27,902	5.7	74,115	7.0
六月 Jun	55,147	6.0	33,446	4.2	88,592	5.3
七月 Jul	64,619 P	5.4 P	39,144 P	3.3 P	103,763 P	4.6 P
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

資料來源：
(1) 海運 ：政府統計處
(2) 1989-1993年河運：海事處
1994 - 1997年河運：香港港口及航運局
1998 - 2001年河運 ：政府統計處
<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
N.A. 沒有數字 P 初步數字 R 修訂數字

Source:
(1) Seaborne cargo : Census & Statistics Department
(2) River cargo 1989 - 1993: Marine Department
River cargo 1994 - 1997: Hong Kong Port and Maritime Board
River cargo 1998 - 2001 : Census & Statistics Department
<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
N.A. Not Available P Preliminary figures R Revised figures

表5：抵港船隻數目
Table 5: No. of Vessel Arrivals

年份/月份 Year/month	遠洋輪船 Ocean Vessel 數目 No.	遠洋輪船 Ocean Vessel 與上年同期比較的升幅(%) Year-on-year growth rate (%)	內河貨船 * River Cargo Vessel * 數目 No.	內河貨船 * River Cargo Vessel * 與上年同期比較的升幅(%) Year-on-year growth rate (%)	內河客輪 River Passenger Ferry 數目 No.	內河客輪 River Passenger Ferry 與上年同期比較的升幅(%) Year-on-year growth rate (%)
1989	19,000	11.2	50,220	-4.5	46,970	3.3
1990	20,360	7.2	54,140	7.8	48,300	2.8
1991	22,630	11.1	57,280	5.8	49,390	2.3
1992	28,260	<1>	67,910	<1>	53,000	<1>
1993	33,040	16.9	76,780	13.1	55,840	5.4
1994	37,000	12.0	92,050	19.9	63,180	13.2
1995	41,480	12.1	109,270	18.7	64,480	2.0
1996	41,760	0.7	112,190	2.7	65,270	1.2
1997	44,480	6.5	122,760	9.4	66,220	1.4
1998	41,690	-6.3	124,610	1.5	65,000	-1.8
1999	37,580	-9.9	115,330	-7.4	59,930	-7.8
2000	37,680	0.3	119,180	3.3	59,810	-0.2
2001						
一月 Jan	2,810	-9.1	7,950	-21.4	5,620	13.8
二月 Feb	2,860	13.2	8,850	29.8	4,590	-11.1
三月 Mar	3,320	6.5	10,670	0.9	5,090	3.7
四月 Apr	3,070	-0.7	9,660	-2.4	5,360	1.9
五月 May	3,040	-3.6	9,760	-4.0	5,120	3.2
六月 Jun	2,920	-3.0	9,860	-3.9	4,940	5.6
七月 Jul	2,880	-11.8	9,440	-9.0	4,890	-3.4
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	2,810	-9.1	7,950	-21.4	5,620	13.8
二月 Feb	5,670	0.9	16,800	-0.8	10,210	1.1
三月 Mar	8,990	2.9	27,460	-0.1	15,300	2.0
四月 Apr	12,060	2.0	37,120	-0.7	20,670	1.9
五月 May	15,100	0.8	46,880	-1.4	25,780	2.2
六月 Jun	18,020	0.2	56,740	-1.9	30,730	2.7
七月 Jul	20,890	-1.7	66,170	-2.9	35,620	1.8
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

資料來源：海事處
<1> 詳情請參閱第ii頁註釋。
R 修訂數字

Source: Marine Department
<1> Please refer to note 1 of page ii.
R Revised figures

* 1999 年以前， 內河貨船統計包括在內河水域內行駛的不完整遊艇及漁船數目。
因這數目微不足道，由1999年起內河貨船統計不包括這些船隻類別。

* Before 1999, river cargo vessel statistics included an incomplete count of pleasure vessels and fishing vessels plying within the river trade limit. As the number is insignificant, river cargo vessel statistics do not include these categories of vessels as from 1999.

表6：抵港貨櫃船數目
Table 6 : No. of Ocean Container Vessel Arrivals

年份/月份 Year/month	半貨櫃船 Semi-container vessels 數目 No.	半貨櫃船 Semi-container vessels 與上年同期比較的升幅(%) Year-on-year growth rate (%)	全槽格式貨櫃船 Fully cellular container vessels 數目 No.	全槽格式貨櫃船 Fully cellular container vessels 與上年同期比較的升幅(%) Year-on-year growth rate (%)
1989	960	-9.9	7,720	11.3
1990	1,050	9.4	8,390	8.6
1991	1,250	18.8	9,230	10.0
1992	2,480	<1>	10,000	<1>
1993	2,670	8.0	11,690	16.9
1994	3,150	17.7	12,940	10.8
1995	3,400	8.1	15,050	16.3
1996	3,300	-3.1	16,570	10.1
1997	3,990	20.9	17,840	7.6
1998	2,800	-29.6	18,740	5.1
1999	1,080	-61.3	18,460	-1.5
2000	490	-55.3	19,450	5.4
2001				
一月 Jan	30	-2.9	1,580	0.2
二月 Feb	40	90.0	1,470	12.2
三月 Mar	70	136.7	1,690	4.8
四月 Apr	50	100.0	1,620	3.1
五月 May	50	121.7	1,590	-1.7
六月 Jun	50	2.3	1,580	-1.5
七月 Jul	50	0.0	1,570	-9.3
八月 Aug				
九月 Sep				
十月 Oct				
十一月 Nov				
十二月 Dec				
累計 Cumulative				
2001				
一月 Jan	30	-2.9	1,580	0.2
二月 Feb	70	31.5	3,050	5.7
三月 Mar	140	69.0	4,740	5.4
四月 Apr	190	76.1	6,360	4.8
五月 May	240	84.1	7,950	3.4
六月 Jun	290	63.6	9,530	2.6
七月 Jul	330	50.5	11,100	0.7
八月 Aug				
九月 Sep				
十月 Oct				
十一月 Nov				
十二月 Dec				

資料來源：海事處
<1> 詳情請參閱第ii頁註釋。
R 修訂數字

Source: Marine Department
<1> Please refer to note 1 of page ii.
R Revised figures

表7：本港貨櫃(進出口)總吞吐量
Table 7: Total (Inward + Outward) Container Throughput

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel	內河貨船 river cargo vessel	小計 sub total	中流作業及其他碼頭 <3> Stream & other terminals <3>	內河貨船 River cargo vessel	合計 Total
	千個標準貨櫃 '000 TEUs					
1989	N.A.	N.A.	3,317	1,067	79	4,464
1990	N.A.	N.A.	3,831	1,198	71	5,101
1991	N.A.	N.A.	4,514	1,573	74	6,162
1992	N.A.	N.A.	5,079	2,461 <1>	432 <1,2>	7,972
1993	N.A.	N.A.	5,797	2,797	610	9,204
1994	N.A.	N.A.	7,278	2,839	933	11,050
1995	8,039	217	8,256	2,930	1,364	12,550
1996	8,218	468	8,686	3,045	1,729	13,460
1997	8,975	515	9,490	3,156	1,922	14,567
	(9,049)	(515)	(9,564)	(2,900)	(1,922)	(14,386)
1998	8,869	686	9,555	2,641	2,386	14,582
1999	9,511	784	10,295	2,838	3,077	16,211
2000	10,664	938	11,603	3,033	3,462	18,098
2001						
一月 Jan	818	88	906	251	275	1,432
二月 Feb	687	76	763	203	209	1,175
三月 Mar	875	94	969	276	313	1,558
四月 Apr	847	88	935	266	340	1,541
五月 May	797	96	893	253	286	1,433
六月 Jun	817	101	917	249	307	1,474
七月 Jul	890	92	982	254	341	1,577
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	818	88	906	251	275	1,432
二月 Feb	1,506	164	1,670	455	483	2,608
三月 Mar	2,381	258	2,639	730	796	4,165
四月 Apr	3,228	346	3,574	996	1,136	5,706
五月 May	4,026	441	4,467	1,249	1,423	7,139
六月 Jun	4,842	542	5,384	1,498	1,730	8,613
七月 Jul	5,732	635	6,367	1,752	2,071	10,190
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel	內河貨船 river cargo vessel	小計 sub total	中流作業及其他碼頭 <3> Stream & other terminals <3>	內河貨船 River cargo vessel	合計 Total
	與上年同期比較的升幅% Year-on-year growth rate %					
1989	N.A.	N.A.	10.5	12.4	-2.5	10.7
1990	N.A.	N.A.	15.5	12.3	-10.6	14.3
1991	N.A.	N.A.	17.8	31.3	4.8	20.8
1992	N.A.	N.A.	12.5	<1>	<1>	29.4
1993	N.A.	N.A.	14.1	13.7	41.3	15.5
1994	N.A.	N.A.	25.6	1.5	52.8	20.1
1995	N.A.	N.A.	13.4	3.2	46.3	13.6
1996	2.2	115.3	5.2	4.0	26.7	7.3
1997	9.2	10.0	9.3	3.6	11.2	8.2
1998	-2.0	33.2	-0.1	-8.9	24.1	1.4
1999	7.2	14.3	7.7	7.5	29.0	11.2
2000	12.1	19.7	12.7	6.8	12.5	11.6
2001						
一月 Jan	-5.3	10.2	-4.0	8.0	-2.7	-1.8
二月 Feb	1.2	39.5	4.0	8.8	7.4	5.4
三月 Mar	4.5	9.1	4.9	10.1	19.7	8.5
四月 Apr	0.5	17.5	1.9	5.1	22.7	6.4
五月 May	-10.6	33.2	-7.4	-0.8	-5.9	-6.0
六月 Jun	-7.4	33.1	-4.2	-1.4	1.3	-2.6
七月 Jul	-11.5	18.8	-9.3	-6.7	18.0	-4.1
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	-5.3	10.2	-4.0	8.0	-2.7	-1.8
二月 Feb	-2.4	22.1	-0.5	8.3	1.4	1.3
三月 Mar	0.0	17.0	1.4	9.0	7.9	3.9
四月 Apr	0.1	17.1	1.6	7.9	11.9	4.6
五月 May	-2.2	20.3	-0.4	6.0	7.8	2.3
六月 Jun	-3.1	22.5	-1.0	4.7	6.6	1.4
七月 Jul	-4.5	21.9	-2.4	2.9	8.3	0.5
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<3> 詳情請參閱第iii頁註釋。
N.A. 沒有數字　P 初步數字　R 修訂數字

<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
<3> Please refer to note 3 of page iii.
N.A. Not Available　P Preliminary figures　R Revised figures

( ) 由1998年起，一系列新的貨櫃吞吐量數字已經開始編製。爲方便比較，按新系列編製的1997年數字於括號內展示。
( ) Starting from 1998, a new series of container throughputs has been compiled. To facilitate comparison, figures for 1997 compiled according to the new series is presented in brackets.

表8：本港進口貨櫃吞吐量
Table 8: Inward Container Throughput

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel	葵涌貨櫃碼頭 <3> 內河貨船 river cargo vessel	葵涌貨櫃碼頭 <3> 小計 sub total	中流作業及其他碼頭 <3> Stream & other terminals <3>	內河貨船 River cargo vessel	合計 Total
	千個標準貨櫃 '000 TEUs					
1989	N.A.	N.A.	1,601	575	46	2,222
1990	N.A.	N.A.	1,830	663	37	2,531
1991	N.A.	N.A.	2,161	861	37	3,059
1992	N.A.	N.A.	2,428	1,284 <1>	220 <1,2>	3,932
1993	N.A.	N.A.	2,750	1,503	314	4,566
1994	N.A.	N.A.	3,397	1,595	477	5,469
1995	3,792	112	3,904	1,612	698	6,215
1996	3,894	253	4,147	1,625	881	6,653
1997	4,312	252	4,564	1,632	984	7,181
	(4,302)	(252)	(4,555)	(1,584)	(984)	(7,123)
1998	4,253	393	4,646	1,458	1,180	7,284
1999	4,419	415	4,834	1,542	1,650	8,027
2000	4,982	524	5,506	1,700	1,773	8,979
2001						
一月 Jan	360	50	409	143	138	691
二月 Feb	359	37	396	119	99	614
三月 Mar	403	51	454	160	155	770
四月 Apr	400	51	451	147	168	766
五月 May	375	54	429	137	135	701
六月 Jun	369	62	431	134	160	725
七月 Jul	395	56	451	140	184	775
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	360	50	409	143	138	691
二月 Feb	719	87	806	262	237	1,305
三月 Mar	1,122	138	1,260	423	392	2,074
四月 Apr	1,522	188	1,710	570	560	2,840
五月 May	1,897	243	2,140	706	695	3,541
六月 Jun	2,266	305	2,571	840	855	4,266
七月 Jul	2,661	361	3,022	980	1,039	5,041
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel	葵涌貨櫃碼頭 <3> 內河貨船 river cargo vessel	葵涌貨櫃碼頭 <3> 小計 sub total	中流作業及其他碼頭 <3> Stream & other terminals <3>	內河貨船 River cargo vessel	合計 Total
	與上年同期比較的升幅% Year-on-year growth rate %					
1989	N.A.	N.A.	9.3	10.1	12.3	9.6
1990	N.A.	N.A.	14.3	15.4	-18.9	13.9
1991	N.A.	N.A.	18.1	29.8	-0.6	20.9
1992	N.A.	N.A.	12.4	<1>	<1>	28.5
1993	N.A.	N.A.	13.2	17.1	42.7	16.1
1994	N.A.	N.A.	23.5	6.1	52.1	19.8
1995	N.A.	N.A.	14.9	1.1	46.4	13.6
1996	2.7	125.2	6.2	0.8	26.2	7.0
1997	10.7	-0.4	10.1	0.4	11.8	7.9
1998	-1.2	55.9	2.0	-7.9	19.9	2.3
1999	3.9	5.6	4.1	5.8	39.8	10.2
2000	12.7	26.4	13.9	10.2	7.5	11.9
2001						
一月 Jan	-7.0	8.6	-5.4	10.3	0.5	-1.3
二月 Feb	5.4	38.2	7.8	7.5	-3.6	5.7
三月 Mar	2.8	15.5	4.1	8.8	14.0	6.9
四月 Apr	3.7	21.5	5.4	-3.7	16.1	5.7
五月 May	-7.4	29.0	-4.0	-3.3	-11.1	-5.3
六月 Jun	-9.7	50.1	-4.2	-10.5	2.0	-4.2
七月 Jul	-14.2	26.5	-10.6	-8.1	17.3	-4.7
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	-7.0	8.6	-5.4	10.3	0.5	-1.3
二月 Feb	-1.2	19.6	0.7	9.0	-1.3	1.9
三月 Mar	0.2	18.0	1.9	8.9	4.2	3.7
四月 Apr	1.1	19.0	2.8	5.4	7.5	4.2
五月 May	-0.7	21.1	1.4	3.6	3.3	2.2
六月 Jun	-2.3	26.0	0.4	1.0	3.1	1.0
七月 Jul	-4.3	26.1	-1.4	-0.4	5.4	0.1
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<3> 詳情請參閱第iii頁註釋。
N.A. 沒有數字　P 初步數字　R 修訂數字

<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
<3> Please refer to note 3 of page iii.
N.A. Not Available　P Preliminary figures　R Revised figures

( ) 由1998年起，一系列新的貨櫃吞吐量數字已經開始編製。為方便比較，按新系列編製的1997年數字於括號內展示。
( ) Starting from 1998, a new series of container throughputs has been compiled. To facilitate comparison, figures for 1997 compiled according to the new series is presented in brackets.

表9：本港出口貨櫃吞吐量
Table 9: Outward Container Throughput

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel	內河貨船 river cargo vessel	小計 sub total	中流作業及其他碼頭 <3> Stream & other terminals <3>	內河貨船 River cargo vessel	合計 Total
	千個標準貨櫃 '000 TEUs					
1989	N.A.	N.A.	1,716	492	33	2,242
1990	N.A.	N.A.	2,001	535	33	2,570
1991	N.A.	N.A.	2,353	712	37	3,102
1992	N.A.	N.A.	2,651	1,178 <1>	212 <1,2>	4,040
1993	N.A.	N.A.	3,047	1,294	297	4,638
1994	N.A.	N.A.	3,881	1,244	456	5,581
1995	4,247	105	4,352	1,317	666	6,335
1996	4,324	215	4,539	1,420	848	6,808
1997	4,663	263	4,926	1,523	938	7,387
	(4,746)	(263)	(5,009)	(1,316)	(938)	(7,264)
1998	4,616	293	4,909	1,183	1,206	7,297
1999	5,092	369	5,461	1,296	1,427	8,184
2000	5,683	414	6,096	1,333	1,689	9,118
2001						
一月 Jan	458	38	497	108	136	741
二月 Feb	328	39	367	85	110	561
三月 Mar	472	43	516	115	158	788
四月 Apr	447	37	484	119	172	775
五月 May	422	41	464	117	151	732
六月 Jun	447	39	486	115	148	749
七月 Jul	495	36	531	114	157	803
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	458	38	497	108	136	741
二月 Feb	787	77	864	193	246	1,303
三月 Mar	1,259	120	1,379	308	404	2,091
四月 Apr	1,706	157	1,863	426	576	2,866
五月 May	2,129	199	2,327	543	727	3,598
六月 Jun	2,576	238	2,814	658	875	4,347
七月 Jul	3,071	274	3,345	772	1,032	5,149
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel	內河貨船 river cargo vessel	小計 sub total	中流作業及其他碼頭 <3> Stream & other terminals <3>	內河貨船 River cargo vessel	合計 Total
	與上年同期比較的升幅% Year-on-year growth rate %					
1989	N.A.	N.A.	11.6	15.2	-17.7	11.8
1990	N.A.	N.A.	16.6	8.7	1.0	14.6
1991	N.A.	N.A.	17.6	33.0	11.0	20.7
1992	N.A.	N.A.	12.6	<1>	<1>	30.2
1993	N.A.	N.A.	15.0	9.9	39.9	14.8
1994	N.A.	N.A.	27.4	-3.9	53.6	20.3
1995	N.A.	N.A.	12.1	5.9	46.1	13.5
1996	1.8	104.7	4.3	7.8	27.3	7.5
1997	7.8	22.4	8.5	7.2	10.6	8.5
1998	-2.7	11.3	-2.0	-10.2	28.6	0.5
1999	10.3	26.0	11.2	9.6	18.4	12.2
2000	11.6	12.2	11.6	2.8	18.4	11.4
2001						
一月 Jan	-3.8	12.2	-2.8	5.0	-5.7	-2.3
二月 Feb	-3.0	40.8	0.3	10.6	19.7	5.1
三月 Mar	5.9	2.5	5.6	12.0	25.9	10.1
四月 Apr	-2.2	12.4	-1.2	18.5	29.9	7.2
五月 May	-13.3	39.1	-10.3	2.2	-0.7	-6.6
六月 Jun	-5.4	12.8	-4.2	12.0	0.6	-1.1
七月 Jul	-9.2	8.7	-8.2	-4.8	18.7	-3.4
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	-3.8	12.2	-2.8	5.0	-5.7	-2.3
二月 Feb	-3.5	25.0	-1.5	7.4	4.1	0.8
三月 Mar	-0.2	15.8	1.1	9.0	11.7	4.1
四月 Apr	-0.7	15.0	0.5	11.5	16.6	4.9
五月 May	-3.5	19.3	-1.9	9.4	12.5	2.3
六月 Jun	-3.8	18.2	-2.3	9.8	10.3	1.7
七月 Jul	-4.7	16.8	-3.3	7.4	11.5	0.9
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<3> 詳情請參閱第iii頁註釋。
N.A. 沒有數字　P 初步數字　R 修訂數字

<1> Please refer to note 1 of page ii.
<2> Please refer to note 2 of page iii.
<3> Please refer to note 3 of page iii.
N.A. Not Available　P Preliminary figures　R Revised figures

( ) 由1998年起，一系列新的貨櫃吞吐量數字已經開始編製。爲方便比較，按新系列編製的1997年數字於括號內展示。
( ) Starting from 1998, a new series of container throughputs has been compiled. To facilitate comparison, figures for 1997 compiled according to the new series is presented in brackets.

表10：按遠洋輪船及內河貨船劃分的本港貨櫃(進出口)總吞吐量
Table 10: Total (Inward + Outward) Container Throughput by ocean vessel and river cargo vessel

年份/月份 Year/month	遠洋輪船 <3> Ocean vessel <3>	內河貨船 River cargo vessel	遠洋輪船 <3> Ocean vessel <3>	內河貨船 River cargo vessel
	千個標準貨櫃 '000 TEUs		與上年同期比較的升幅% Year-on-year growth rate %	
1995	10,968	1,581	N.A.	N.A.
1996	11,263	2,197	2.7	38.9
1997	12,130	2,437	7.7	10.9
	(11,949)	(2,437)		
1998	11,510	3,072	-3.7	26.0
1999	12,350	3,861	7.3	25.7
2000	13,697	4,401	10.9	14.0
2001				
一月 Jan	1,070	363	-2.5	0.1
二月 Feb	891	285	2.8	14.4
三月 Mar	1,151	407	5.8	17.1
四月 Apr	1,113	428	1.6	21.6
五月 May	1,051	382	-8.5	1.6
六月 Jun	1,066	408	-6.1	7.7
七月 Jul	1,144	434	-10.5	18.1
八月 Aug				
九月 Sep				
十月 Oct				
十一月 Nov				
十二月 Dec				
累計 Cumulative				
2001				
一月 Jan	1,070	363	-2.5	0.1
二月 Feb	1,960	647	-0.1	5.9
三月 Mar	3,111	1,054	2.0	10.0
四月 Apr	4,224	1,482	1.9	13.1
五月 May	5,275	1,864	-0.4	10.5
六月 Jun	6,340	2,272	-1.4	10.0
七月 Jul	7,484	2,706	-2.9	11.2
八月 Aug				
九月 Sep				
十月 Oct				
十一月 Nov				
十二月 Dec				

<3> 詳情請參閱第iii頁註釋。
N.A. 沒有數字　P 初步數字　R 修訂數字

<3> Please refer to note 3 of page iii.
N.A. Not Available　P Preliminary figures　R Revised

( ) 由1998年起，一系列新的貨櫃吞吐量數字已經開始編製。爲方便比較，按新系列編製的1997年數字於括號內展示。
( ) Starting from 1998, a new series of container throughputs has been compiled. To facilitate comparison, figures for according to the new series is presented in brackets.

表11：本港貨櫃(進出口)總吞吐量的百分比分布(按處理地點分析)
Table 11 : Percentage Distribution of Total (Inward + Outward) Container Throughput by Handling Location

年份/月份 Year/month	葵涌貨櫃碼頭 <3> Kwai Chung Terminals <3> 遠洋輪船 ocean vessel %	內河貨船 river cargo vessel %	小計 sub total %	中流作業及其他碼頭 <3> Stream & other terminals <3> %	內河貨船 River cargo vessel %	合計 Total %
1989	N.A.	N.A.	74.3	23.9	1.8	100.0
1990	N.A.	N.A.	75.1	23.5	1.4	100.0
1991	N.A.	N.A.	73.3	25.5	1.2	100.0
1992	N.A.	N.A.	63.7	30.9 <1>	5.4 <1,2>	100.0
1993	N.A.	N.A.	63.0	30.4	6.6	100.0
1994	N.A.	N.A.	65.9	25.7	8.4	100.0
1995	64.1	1.7	65.8	23.3	10.9	100.0
1996	61.1	3.5	64.5	22.6	12.8	100.0
1997	61.6	3.5	65.1	21.7	13.2	100.0
	(62.9)	(3.6)	(66.5)	(20.2)	(13.4)	(100.0)
1998	60.8	4.7	65.5	18.1	16.4	100.0
1999	58.7	4.8	63.5	17.5	19.0	100.0
2000	58.9	5.2	64.1	16.8	19.1	100.0
2001						
一月 Jan	57.1	6.1	63.3	17.5	19.2	100.0
二月 Feb	58.5	6.5	64.9	17.3	17.8	100.0
三月 Mar	56.2	6.0	62.2	17.7	20.1	100.0
四月 Apr	55.0	5.7	60.7	17.2	22.1	100.0
五月 May	55.6	6.7	62.3	17.7	20.0	100.0
六月 Jun	55.4	6.8	62.2	16.9	20.9	100.0
七月 Jul	56.4	5.9	62.3	16.1	21.6	100.0
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						
累計 Cumulative						
2001						
一月 Jan	57.1	6.1	63.3	17.5	19.2	100.0
二月 Feb	57.7	6.3	64.0	17.4	18.5	100.0
三月 Mar	57.2	6.2	63.4	17.5	19.1	100.0
四月 Apr	56.6	6.1	62.6	17.5	19.9	100.0
五月 May	56.4	6.2	62.6	17.5	19.9	100.0
六月 Jun	56.2	6.3	62.5	17.4	20.1	100.0
七月 Jul	56.3	6.2	62.5	17.2	20.3	100.0
八月 Aug						
九月 Sep						
十月 Oct						
十一月 Nov						
十二月 Dec						

<1> 詳情請參閱第ii頁註釋。
<2> 詳情請參閱第iii頁註釋。
<3> 詳情請參閱第iii頁註釋。
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( ) Starting from 1998, a new series of container throughputs has been compiled. To facilitate comparison, figures for 1997 compiled according to the new series is presented in brackets.

表12：空貨櫃所佔百分比(按標準貨櫃單位計算)
Table 12: Percentage Share of Empty Containers (in TEU)

年份/月份 Year/month	葵涌貨櫃碼頭 Kwai Chung Terminals <3> 抵港 Inward % 遠洋輪船 ocean vessel	內河貨船 river cargo vessel	小計 sub total	離港 Outward % 遠洋輪船 ocean vessel	內河貨船 river cargo vessel	小計 sub total	合計 Total %	中流作業及其他碼頭 <3> Stream & other terminals <3> 抵港 Inward %	離港 Outward %	合計 Total %	內河貨船 River cargo vessel 抵港 Inward %	離港 Outward %	合計 Total %	總計 Total 抵港 Inward %	離港 Outward %	合計 Total %
1989	N.A.	N.A.	29.8	N.A.	N.A.	5.1	17.0	14.7	16.0	15.3	48.2	25.4	38.7	26.3	7.8	17.0
1990	N.A.	N.A.	29.5	N.A.	N.A.	7.1	17.8	18.1	13.4	16.0	29.5	36.0	32.6	26.5	8.8	17.6
1991	N.A.	N.A.	28.3	N.A.	N.A.	5.5	16.4	11.4	13.8	12.5	31.9	30.5	31.2	23.6	7.7	15.6
1992	N.A.	N.A.	27.8	N.A.	N.A.	4.6	15.7	9.8 <1>	15.3 <1>	12.4	40.5 <1,2>	25.8 <1,2>	33.3	22.6	8.9	15.7
1993	N.A.	N.A.	28.1	N.A.	N.A.	5.9	16.4	10.4	13.3	11.7	36.5	29.8	33.3	22.8	9.5	16.1
1994	N.A.	N.A.	19.7	N.A.	N.A.	7.8	13.3	8.7	14.2	11.1	38.7	28.1	33.5	18.1	10.8	14.4
1995	20.1	2.5	19.6	7.7	39.2	8.4	13.7	9.0	16.1	12.2	48.7	30.9	40.0	20.1	12.4	16.2
1996	20.2	13.3	19.7	7.9	22.7	8.6	13.9	13.8	14.1	13.9	53.9	29.2	41.8	22.8	12.3	17.5
1997	19.0	14.0	18.8	8.3	24.8	9.2	13.8	15.8	16.6	16.2	55.3	29.0	42.5	23.1	13.2	18.1
	(19.1)	(14.0)	(18.8)	(8.1)	(24.8)	(9.0)	(13.7)	(16.3)	(19.2)	(17.6)	(55.3)	(29.0)	(42.5)	(23.3)	(13.4)	(18.3)
1998	27.2	15.0	26.1	6.9	41.6	9.0	17.3	13.7	26.1	19.3	49.3	29.0	39.0	27.4	15.0	21.2
1999	27.1	12.6	25.9	5.1	35.4	7.1	15.9	11.8	20.0	15.5	53.6	31.1	43.2	28.9	13.3	21.0
2000	31.2	17.3	29.9	4.4	24.4	5.7	17.2	10.1	15.4	12.4	51.4	33.6	42.7	30.4	12.3	21.3
2001一月 Jan	31.3	13.5	29.2	3.6	21.8	5.0	15.9	11.3	12.8	11.9	42.3	36.6	39.5	28.1	11.9	19.7
二月 Feb	30.6	17.1	29.4	7.3	17.2	8.3	19.2	9.0	12.9	10.7	46.3	33.5	39.5	28.2	13.9	21.4
三月 Mar	23.5	14.4	22.5	5.1	19.8	6.3	13.9	8.0	13.2	10.2	47.9	38.2	43.0	24.6	13.7	19.1
四月 Apr	28.2	19.9	27.2	4.7	12.4	5.3	15.9	8.3	14.1	10.9	41.6	36.9	39.2	26.8	13.7	20.2
五月 May	28.3	21.2	27.4	4.7	18.3	5.9	16.2	5.7	12.2	8.7	47.7	36.8	42.0	27.1	13.3	20.1
六月 Jun	29.1	24.9	28.5	4.0	14.5	4.8	15.9	8.2	12.3	10.1	49.2	39.2	44.4	29.3	12.7	20.9
七月 Jul	29.7	17.0	28.1	3.1	19.3	4.3	15.2	6.8	13.1	9.6	49.8	39.9	45.3	29.4	12.5	20.8
八月 Aug																
九月 Sep																
十月 Oct																
十一月 Nov																
十二月 Dec																
累計 Cumulative																
2001一月 Jan	31.3	13.5	29.2	3.6	21.8	5.0	15.9	11.3	12.8	11.9	42.3	36.6	39.5	28.1	11.9	19.7
二月 Feb	31.0	15.1	29.3	5.1	19.5	6.4	17.4	10.3	12.8	11.4	44.0	35.2	39.5	28.1	12.8	20.5
三月 Mar	28.3	14.8	26.8	5.1	19.6	6.4	16.1	9.4	13.0	10.9	45.5	36.4	40.9	26.8	13.1	20.0
四月 Apr	28.3	16.2	26.9	5.0	17.9	6.1	16.1	9.1	13.3	10.9	44.4	36.5	40.4	26.8	13.3	20.0
五月 May	28.3	17.3	27.0	4.9	18.0	6.1	16.1	8.5	13.1	10.5	45.0	36.6	40.7	26.9	13.3	20.0
六月 Jun	28.4	18.9	27.3	4.8	17.4	5.8	16.1	8.4	12.9	10.4	45.8	37.0	41.4	27.3	13.2	20.2
七月 Jul	28.6	18.6	27.4	4.5	17.7	5.6	15.9	8.2	13.0	10.3	46.5	37.5	42.0	27.6	13.1	20.3
八月 Aug																
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<1> 詳情請參閱第ii頁註釋。
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( ) Starting from 1998, a new series of container throughputs has been compiled. To facilitate comparison, figures for 1997 compiled according to the new series is presented in brackets.

表13：海運貨物貨櫃運輸百分比
Table 13 : Percentage of Containerisation for Seaborne Cargo

年份/季度 Year/ quarter	抵港 Inward 直接船運 Direct shipment %	抵港 Inward 轉運 Trans-shipment %	抵港 Inward 合計 Total %	離港 Outward 直接船運 Direct shipment %	離港 Outward 轉運 Trans-shipment %	離港 Outward 合計 Total %	抵港＋離港 Inward + Outward 直接船運 Direct shipment %	抵港＋離港 Inward + Outward 轉運 Trans-shipment %	抵港＋離港 Inward + Outward 合計 Total %
1989	27.4	67.6	33.2	69.4	88.8	76.9	37.0	78.8	45.9
1990	30.9	75.9	36.8	73.0	91.6	79.8	40.9	84.5	49.7
1991	34.2	85.4	41.6	72.2	94.2	80.2	43.7	90.0	53.5
1992 <1>	36.1	86.9	43.1	78.7	95.3	84.6	46.2	91.2	55.3
1993	37.9	88.1	45.2	80.3	96.9	85.9	48.1	92.4	57.0
1994	43.3	91.6	52.0	79.8	97.7	86.7	52.5	94.6	62.7
1995	43.7	96.5	53.3	78.2	99.1	87.1	52.1	97.8	63.9
1996	45.7	97.2	54.6	77.6	98.8	86.5	53.3	98.0	64.6
1997	46.7	96.9	55.5	77.9	97.6	86.3	54.2	97.3	65.1
1998	44.1	96.9	52.9	82.5	97.5	88.7	52.8	97.2	63.4
1999	46.9	95.0	57.6	91.8	98.1	94.6	57.8	96.4	69.0
2000	49.1	94.6	61.8	93.4	98.5	95.8	61.0	96.3	73.0
2001									
第一季 Q1	45.8	93.9	60.8	93.8	98.2	96.1	57.6	95.8	72.0
第二季 Q2	43.2	93.3	57.6	93.0	98.5	95.8	55.4	95.6	69.6
第三季 Q3									
第四季 Q4									
累計 Cumulative									
2001									
第一季 Q1	45.8	93.9	60.8	93.8	98.2	96.1	57.6	95.8	72.0
第二季 Q2	44.5	93.6	59.1	93.4	98.3	95.9	56.4	95.7	70.8
第三季 Q3									
第四季 Q4									

資料來源：政府統計處

貨櫃運輸百分率 = 貨櫃貨物數目 / 直接船運/轉運貨物總數

<1> 詳情請參閱第ii頁註釋。

Source : Census & Statistics Department

Percentage of containerisation = Containerised cargo / Total direct / transhipment cargo

<1> Please refer to note 1 of page ii.

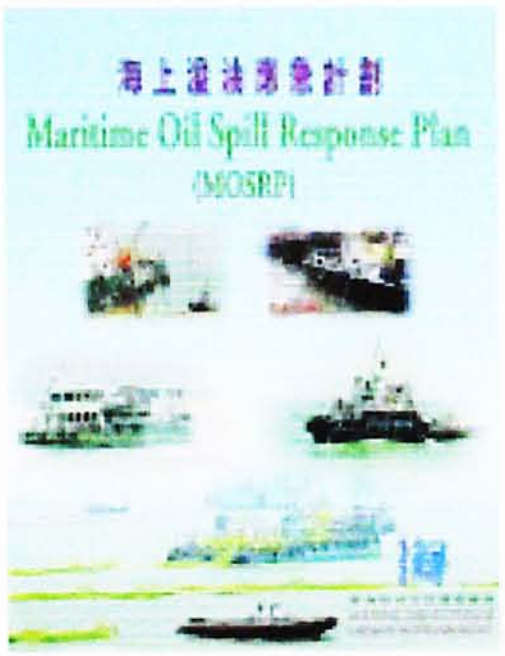
Maritime Oil Pollution Contingency Plan

The Hong Kong Special Administrative Region Government's Marine Department has prepared a new Maritime Oil Spill Response Plan (MOSRP) to comply with standards that are expected of a world-class port.

The plan is in line with the provisions of the International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC). It replaces an older version, which has been in use since 1974.

The MOSRP aims to ensure a quick and effective response to oil spills in local waters and allows Hong Kong to assist neighbouring ports in the event of a major crisis.

Marine Department officials have already been working closely with the neighbouring ports of Guangdong, Guangzhou, Macau, Shenzhen and Zhuhai to develop a co-ordinated contingency plan to cover the Pearl River and the region in general.



Search-and-Rescue and Oil Pollution Control Exercise

Hong Kong despatched six vessels and more than 50 emergency staff to help tackle one of the worst oil spills to hit the Pearl River Estuary. Fortunately, the incident was no more than an exercise but the experience proved the effectiveness of the Marine Department in dealing with a crisis situation.

The exercise was aptly held on World Environment Day and took place immediately west of Neilingding Dao about seven nautical miles outside Hong Kong waters.

Organised by the Maritime Safety Administration, the drill included emergency crew from the port authorities of Guangdong, Guangzhou, Shenzhen, Zhuhai and Macau as well as Hong Kong.

The crisis scenario involved a major spill of more than 500 tonnes of heavy fuel oil, which threatened the waters governed by all the participating authorities. The drill proved to be a success with excellent co-operation and teamwork displayed by all those involved.

Marine Department, Hong Kong Special Administrative Region Government, Harbour Building, 38 Pier Road, Hong Kong
G.P.O Box 4155 Enquiries: 2542 3711 Fax: 2541 7194, 2544 9241
Web site: http://www.info.gov.hk/mardep
E-mail:webmaster@mardep.gcn.gov.hk
Hong Kong Maritime News Editorial Board Tel: 2852 4423
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Testing readiness of Hongkong's oil combat contingency

AN OIL combat drill code-named "Sundance 2000" was carried out in October to test the response from various parties involved in containing and cleaning up oil spills.

The exercise, which was carried out at the ungazetted beach off Pearl Island, Tuen Muan, involved Government Departments and oil companies.

"The drill was to test the ability, limitation and contingency in boom deployment, clean-up application and communication, and to seek possible enhancement in future response strategy," said Senior Marine Officer Mr LK Szeto.

The exercise simulated a 30,000 tonnes deadweight tonnes laden tanker "Sundance 2000" which had run aground off Pearl Island with 200 tonnes of heavy fuel oil spilt into the water at 0850 hrs on October 19, 2000.

According to the Marine Department, the number of oil pollution cases in Hong Kong fell to 86 in 1999 from 94 in 1998.

And between January to October 16, 2000 the number of cases decreased even further to 42.

Marine Department coordinates search-and-rescue drill

FIVE Government departments and three shipping companies took part in a marine search-and-rescue exercise, code-named "Sarex Two Thousand" on October 17, 2000.

The drill -- coordinated by the Marine Department's Maritime Rescue Coordination Centre (MRCC) at the waters to the south of Lamma Power Station -- involved a staged collision of two high-speed ferries, Ferry X and Ferry Y.

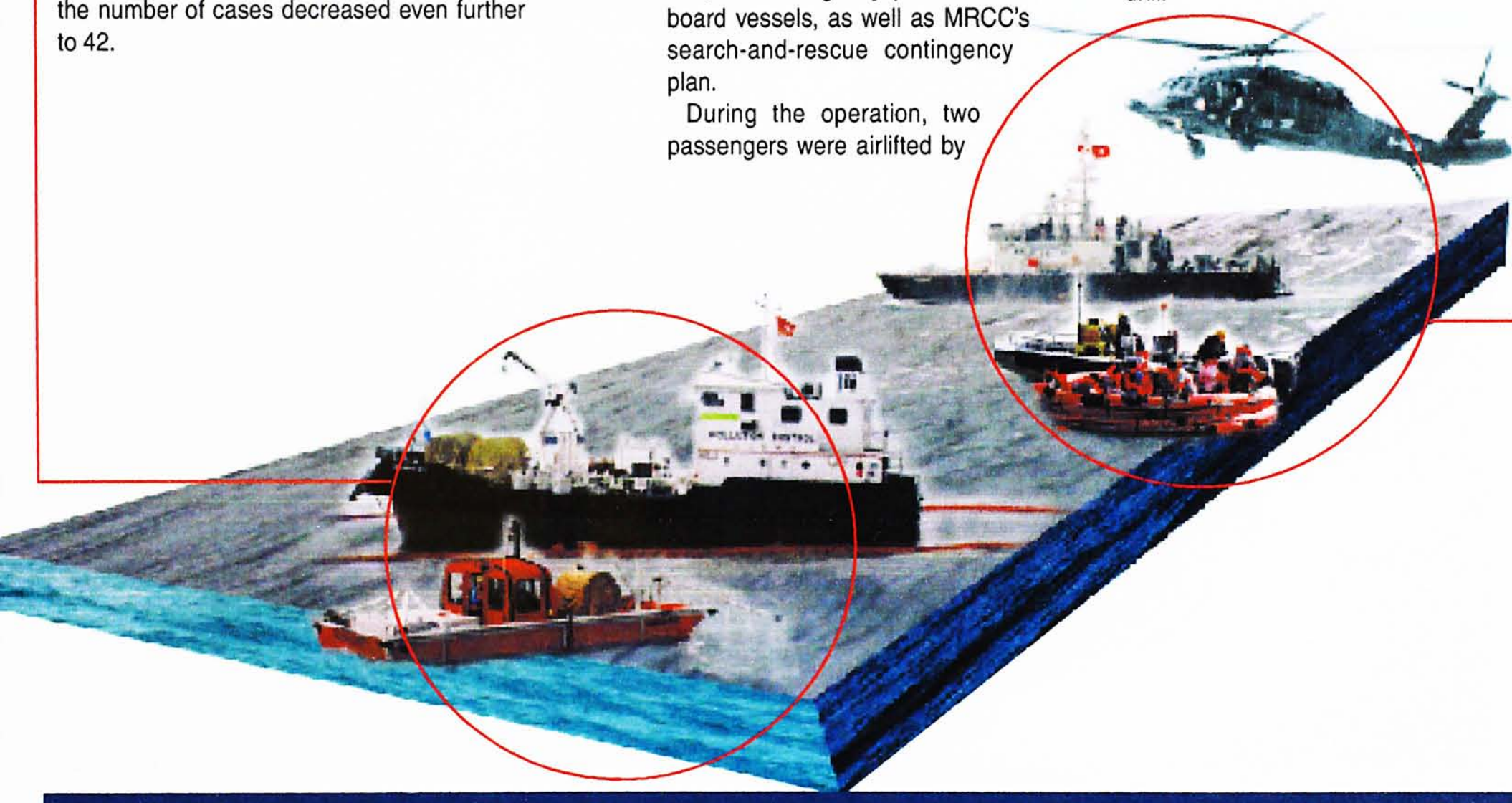
"As there are many high-speed ferries going in and out of Hong Kong daily, there is a need to ensure quick response action is taken in case of emergencies," Senior Marine Officer Mr KW Chan said.

The exercise tested the communication efficiency between MRCC and high-speed ferries during emergencies, the emergency procedures on board vessels, as well as MRCC's search-and-rescue contingency plan.

During the operation, two passengers were airlifted by helicopter to the hospital – the first involved a seriously injured passenger and the second was another passenger who fell overboard into the water.

A third high-speed ferry, Ferry Z, helped to transport the passengers of Ferries X and Y back to Hong Kong.

Five Government launches and one helicopter from the Marine Department, Marine Police, Fire Services Department, Government Flying Service and over 100 Civil Aid Service staff participated in the exercise. Meanwhile, Shun Tak-China Travel Shipping Investments Ltd, Chu Kong Passenger Transport Company Ltd and New World First Ferry Services Ltd each deployed a high-speed ferry to take part in the drill.



Annual Meeting between Marine Department and Recognised Organisations

THE Marine Department has underlined the importance of seven classification societies known as Recognised Organisations (ROs) and their roles as an RO to the success of the Hong Kong Shipping Register.

As ROs, they carry out statutory duties of a flag administration such as the survey and certification of Hong Kong-registered ships. Without them, the register cannot be operated efficiently and cost effectively.

The ROs recognised by Hong Kong include the American Bureau of Shipping, Bureau Veritas, China Classification Society, Det Norske Veritas, Germanischer Lloyd, Lloyd's Register of Shipping and Nippon Kaiji Kyokai.

The Marine Department held its annual meeting with representatives of ROs on October 16, 2000. The meeting was followed by a social gathering. It provided an opportunity to surveyors on both sides to discuss operational difficulties and problems in a relaxing atmosphere.

At the meeting, five main issues were discussed. They included the annual performance report of ROs, the acceptance of old tonnages not classed with the ROs and the implementation of ISM Code on Hong Kong registered ships. The meeting also discussed the draft new agreement for the next five years and the request for the notification of ROs when port state control officers required their assistance to clear deficiencies.

Hong Kong contributes to international study to improve bulk carrier safety

The Hong Kong Marine Department, with the active co-operation of the Hong Kong Shipowners Association, is making substantial contribution towards an international study for the improvement of bulk carrier safety.

The study, based on Formal Safety Assessment (FSA) principles and being co-ordinated by the International Project Steering Board, is due to be concluded by December 2002. It will have far-reaching impact on the regulatory regime governing bulk carrier safety.

"Of the total 264 hazards identified by the study, 44 were provided by Hong Kong," said Mr Suresh K Anand, Assistant Director(Multi-lateral policy) of the Hong Kong Marine Department.

Hong Kong will remain active in this study to ensure that it is as thorough as possible and that final recommendations are reasonable, practical and effective.

The study was triggered off by recommendations made by the re-opened UK formal investigation into the sinking of the bulk carrier "Derbyshire" in 1980 and an earlier joint UK and European Community in-depth underwater survey of the "Derbyshire" wreck.

In the 1980s and 1990s, a number of sudden bulk carrier sinking worldwide sparked off global concerns about safe design and construction of ships.

Though the International Maritime Organisation implemented several measures such as the enhanced survey programme and improved floodability of holds, these were deemed to be a piecemeal approach and the industry indicated a strong need for a comprehensive study into this matter.

The Formal Safety Assessment format study will have far-reaching impact on the regulatory regime governing bulk carrier safety.

Hong Kong Marine Department's new training centre opens

▲ *The 250-square-metre training centre boasts a stylish reception area.*

The Hong Kong Marine Department opened a new training centre at the Government Dockyard, Stonecutters Island in May for training departmental officers.

Following substantial refurbishment, the 250-square-metre centre comprises modern lecture rooms with advanced audio-visual training aids, a stylish reception area and a spacious student resting area.

"We are in the process of procuring a full mission ship simulator for the centre, which we hopefully can get by the end of next year," said Hong Kong Marine Department's Senior Marine Officer (Training) Mr Steven Lam.

He said the proposed system consisted of a 210 degree horizontal field of view through seven channels projection and a mock up bridge with fully equipped control console.

The facility is intended to provide training in navigation and to familiarise officers to bridge operation through tailored simulation exercises.

"In the longer term, the simulation facilities will also be developed to conduct assessment of pilots and other maritime personnel, and planning of port infrastructure," Mr Lam said.

Meanwhile, apart from traditional training facilities, a Vessel Traffic Service (VTS) training simulator and a Global Maritime Distress and Safety System (GMDSS) training simulator will be installed in the centre later this year for training VTS operators and supervisors.

Dedicated VTS courses are expected to be launched early next year.

The VTS training, based on model courses developed by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), will be in line with international standards.

Those who successfully complete the VTS course and assessment will receive a certificate in accordance with IALA requirement.

The centre aims to establish an ISO 9001 quality management system with accreditation for VTS training based on IALA's guidelines.

▲ *Computer graphic portraying the training centre at Marine Department.*